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Twenty-Second Year of Publication

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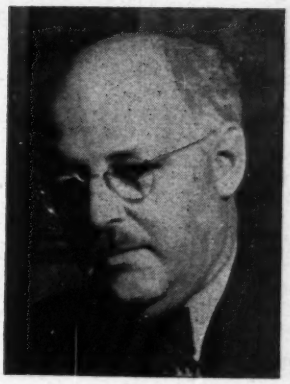
THERMALLY THINKING

By ELLIOTT TAYLOR, Washington Editor



A Merchandising Code

THE decision expressed last fall, whereby the Gas Appliance Manufacturers Association elected to raise and spend its own promotional fund instead of throwing it into the general pot for another year with the advertising and promotion money raised by the American Gas Association, is, we believe, both sound and constructive.

We favor the appliance manufacturers' viewpoint in this respect for two reasons—first because if they administer their own program and do it successfully it is likely to mean more money spent in advertising gas and gas appliances to the public. A quarter of a million dollars or thereabouts handed over to the A.G.A. is likely always to loom as a top figure in the minds of the appliance association members, many of whom resented the assessment, not so much on the grounds of the amount of money involved, as the fact that the administration of it should be turned over to the utilities. With their own promotional program under way, it should and will be a matter of pride and personal interest to merchandising-minded appliance makers to see that their own effort is outstanding, and to be prepared to finance it accordingly.

The second point in favor of the G.A.M.A. viewpoint lies in its acceptance of a greater responsibility for dealer education, stimulation and cooperation than can be expected of the A.G.A. The selling of gas appliances is in a large measure in the hands of the almost infinite number of independent retail outlets—department and furniture stores, hardware, gas and electric appliance dealers, plumbers and heating contractors. Of these thousands of front line contacts with the consumer, there must be many who regard with suspicion and misgivings the activities of their local gas companies whom they too often regard as their principal competitors. Yet it is safe to say that regardless of how he may rate his gas company, there is not a single appliance dealer who doesn't have a mutually satisfactory business relationship with one or more manufacturers of appliances. That relation may be typified simply by a personal liking or respect for an individual salesman, and confidence in his merchandise; but as far as the gas industry is concerned, that salesman is its public relations man with that dealer. He is the number one ambassador in his territory for the gas range or water heater manufacturer who employs him.

Reduced to simple terms the manufacturers of appliances, working in cooperation, can aspire to do no more than all of the salesmen of all appliances have tried to do for many years; they can only plan and labor to the end that they make better merchandisers out of the dealers. Exhortation, training, and education all have their part in any such program; but in the long run more and better dealers will be created only to the extent that better merchandising of gas appliances proves profitable to them as individuals.

Right now the manufacturers are in earnest search of a formula that will accomplish this desirable end. Numerous plans, programs, proposals and propositions have been entertained. While some may be slightly grandiose for an initial effort, all have their aspects of merit. But in all of the discussions that we have heard, it seems to us that the keystone is missing from the arch—and that keystone is a rational statement of the fundamentals of utility-dealer relationship about which any appliance promotion campaign must be constructed.

With such elementary proposals as the fact that more appliances must be sold; that dealer sales effectiveness must be increased; that leadership in the undertaking is up to the manufacturers; there can be no dispute. But when utilities and dealers are to be asked to support and cooperate in an undertaking that is presumed to be for their mutual advantage, the question that first arises is, on what terms?

The G.A.M.A. is discussing the possibility of sending out field men to work with dealers, and of sponsoring a dealer trade publication that will educate them in the most advanced and approved methods of appliance selling. But it is idle to talk of sending out field representatives to speak in terms of a unified industry promotional effort, and it is idle to talk of handing dealers a trade publication dedicated to the same subject, until some fundamental basic principles at least, dealing with utility and dealer relationships have been developed.

There are territories in which the gas companies are aggressive merchandisers, and yet have the cooperation and the good will of the dealers. There are others in which the utilities lean over backward to give dealers commissions on sales that they may never have even helped to make, but where they still have not earned the dealers' respect or enthusiasm. Then, of course, there are infinite

variations and gradations of cooperation between these two extremes.

What factors common to the most successful experiences could be combined into a basic formula applicable to all? What sort of "trouble shooting" by G.A.M.A. would utilities welcome, or even countenance among the dealers with whom they do cooperate? What is the maximum of utility activity that the dealers would consider fair to them? What sort of programs, over a period of years have resulted in the greatest local saturation of the market for gas appliances? What has been productive of the most desirable load for gas companies? Can combination utilities support the same program in their gas and electric sales departments?

These are not all of the questions that remain to be answered; nor are they unanswerable. But they cannot be answered by adopting arbitrary assumptions, based on the visions of professional promoters, or on what conditions should be like whether they are or not. Even conditions that appear to be parallel in other fields must be viewed as dubious criteria until they can be shown to be specifically applicable to gas appliance problems.

For this reason, and while we laud the determination of the appliance industry to proceed with promotional plans, we believe that the details of those plans cannot safely be built on the present limited knowledge of the whole complex national structure of dealer-utility relations.

Indicated as prerequisite in our opinion, is an immediate nation-wide study of those relationships as they now exist. Out of the compilation and the review of the findings it should then be possible to work a basic framework, a code, to which every local situation could be adjusted in accordance with its own peculiarities, practices and regional requirements.

A Modern Appliance Merchandising Code could well be G.A.M.A.'s great 1946 contribution toward the art and science of gas appliance merchandising.

Boo!

IN a rather acrid holiday greeting issued out of Washington on Dec. 21 the Federal Power Commission reaffirmed its faith in mankind by warning the natural gas companies subject to its jurisdiction that if they are breaking the law they had better stop because the Commission is going to "take appropriate action against any such company constructing or operating facilities in violation of the Natural Gas Act."

As strictly lay brothers, in the legal sense, to whom the provisions of a municipal parking ordinance often prove baffling beyond possibility of mortal solution, we are deeply mystified and considerably overawed by such a stern admonition coming straight down from the upper reaches of federal omniscience.

Does this mean that we have been consorting with malefactors, that our humble efforts in the field of composition for profit are being distributed abroad in an industry that abounds with violators of the Natural Gas Act? "It has come to the attention of the Commission . . . ." the Commission says, "that certain natural gas companies subject to the jurisdiction of the Commission have constructed, and in some instances operated, facilities without having received prior authorization required by Section 7 of the Natural Gas Act."

Is this a legitimate statement of fact by the Commission? Or is it an example of its belief in the efficacy of bully and fluff as interim measures whereby it can seize controls that were never specifically handed to it by law? Is it concerned with the alleged violations under Section 7 of the act, or is it apprehensive over the delimitation of its own authority contained in Section 1 (b) of that same piece of legislature?

Is the Commission calling for a showdown on its authority over direct sales from pipelines, or is it seeking to avoid such a showdown by threat and intimidation? If the natural gas pipeline companies are violating the law, why not hale them into court?

If we ever should burgle a neighbor's bungalow, we may expect the police to track us down and throw us into the black hole, there to await trial for our grevious error. That we would have to be prepared to submit to. But we don't propose to have the peace and quiet of our orderly suburban existence despoiled by a lot of local harness bulls coming up to the house all hours of the night, or right before Christmas and warning us that we had better not burgle, or putting pieces in the local paper to the effect that "appropriate action" will be taken against us if we do.

But right in the holiday season the Commission didn't want to play the role of old sour-puss too long, because toward the end of the piece it said, "The Commission realizes that the problems of the reconversion period came upon the industry suddenly." When, as far as we are concerned they didn't come soon enough, but we will have to await the publishing of the unexpurgated memoirs of some reformed bureaucrat before we can tell how the permament federal hierarchy took the matter of peace.

Good advice follows, for the Commission now pats the good little boys in the industry on the head and tells them that "proper planning and timely application for authority to construct new facilities will reduce so-called emergency applications under Section 7 of the Natural Gas Act, and thus provide for adequate capacity and service."

Section 7 of the Natural Gas Act! That has been our favorite reading ever since 1942 when it was passed, especially Section 7 (f); the one that says the Commission can define service areas within which the natural gas companies may enlarge or expand their facilities for the purpose of supplying increased market demands without specific further authorization.

What a time saver that will be for the Commission and for the natural gas industry when the agency finally gets around to complying with the obvious intention of Congress which was to relieve the federal bureau of both the responsibility for and authority over the routine extensions of service and improvements to facilities which it was anticipated companies would be permitted to make as their autonomous legal right.

We opine that it is not concern over the action of companies subject to its jurisdiction that is vexing and troubling the Federal Power Commission, right as a new year dawns, but rather some shady misgivings as to what might be the court's interpretations of the jurisdiction.

If that is what the Commission is worried about, now, it would appear, is its chance to get a decision. In the meantime it ought to be ashamed of itself going around in the dark, practically on Christmas eve, yelling "Boo!" at the little public utilities.

Highlights

• A portable "flash freezing" unit has been developed by Dr. Luis H. Bartlett, University of Texas, Austin. The new machine operates on the principle of a cylinder which acts as a refrigerating surface and as a conveyor to bring the food into contact with the chilling fluid, then to separate the food from the fluid after freezing. The process works so quickly that it eliminates ice crystals within the cells of the frozen food.

• The first report on natural gas reserves is expected to be ready for the annual meeting of the American Gas Association in October, according to N. C. McGowen, chairman of the Association's Committee on Natural Gas Reserves.

• In the first 10 months of 1945 a group of electric appliance manufacturers spent $370,817 as against the $330,345 spent by a group of gas appliance manufacturers in range advertising. Expenditures for advertising kitchens were $355,540 by the A.G.A. as compared to $932,740 by a group of electric appliance manufacturers.

• Contracts were awarded in November for 10,953 new dwelling units to cost $72.5 million in the 37 states east of the Rocky Mountains, F. W. Dodge Corp. reported Jan. 2. Dollar volume of all construction contracts in the 37 eastern states during the first 11 months of 1945 totalled $2.97 billion as compared to $1.80 billion in the corresponding period of 1944.

• Approval by the California Railroad Commission is expected on the application of Southern California and Southern Counties Gas Co.'s to build a 214-mile 26-in. gas line to connect with the proposed El Paso Natural Gas Co. line from the Hugoton field and Permian Basin fields into the Southern California area. Hearings before the California Commission were concluded in December and upon the rendering of a favorable decision, the matter will be presented to the Federal Power Commission.

• A trend toward lower returns for natural gas pipeline companies is seen in the Federal Power Commission's decision in the Mississippi River Fuel Co. rate case, in which return allowed was reduced from 6½% to 6% based on the corporation's depreciated rate basis.

• The Federal Power Commission at its annual meeting Dec. 14 unnanimously elected Commissioner Leland Olds chairman for the remainder of his present appointment which expires June 22, 1949. Burton N. Behling last month was appointed special assistant to the Commission to act as director of the Natural Gas Investigation. George Slaff has resigned as chief counsel of the Investigation to become counsel for Goldwyn Productions, Inc.

• Gas Appliance Manufacturers Association is the new and simplified name for the Association of Gas Appliance and Equipment Manufacturers. Harold Massey, formerly with American Radiator and Standard Sanitary Corp., has been appointed assistant managing director.

• Liquidation of the Petroleum Industry War Council was announced Dec. 26 by PAW Administrator Harold L. Ickes. Personnel and activities of PAW are gradually being scaled down toward eventual dissolution, although advisory committees in the five PAW districts will remain active throughout the winter.

• The annual spring meeting of the Natural Gas Department has been set for May 7 and 8 at the Gibson Hotel in Cincinnati.

• Natural gas used as boiler fuel in highly industrialized Illinois amounts to about 7% of all gas distributed by the state's 12 major companies, according to Warren Henry, acting chief engineer, Illinois Commerce Commission, who discussed "end use" of imported gas in Illinois before the recent convention of the National Association of Railroad and Utilities Commissioners.

• The Indiana Public Service Commission has ruled that the state has the authority to regulate direct industrial sales of natural gas. The opinion was handed down in the case of Panhandle Eastern Pipe Line Co. which sells gas directly to Anchor-Hocking Glass Co. in Indiana.

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FUTURE PROSPECTS

For Natural Gas

By G. G. OBERFELL

Vice President in Charge of Research and Development
Phillips Petroleum Co., Bartlesville, Oklahoma

VARIOUS social, political and economic factors, in addition to such items as form, utility and place value, investments in existing facilities, and future technical developments will exert their influences in varying amount on future gas utilization. Politically, subsidies and taxes could markedly influence the use of natural gas. The subsidies granted for distribution of electric power through the Rural Electrification Administration have not had a counterpart to date in natural gas or hydrocarbon fuel distribution. On the other hand, the taxes on motor fuel in some instances now exceed the selling price of the motor fuel at the refineries.

Through such taxation, it is possible to retard new developments or conversely through subsidies of one form or another it is possible to bring into being at an earlier date operations which would normally be considered uneconomical. For example, synthetic rubber was a war justification. In my opinion, the influence of Government, through both subsidies and taxes, will be far greater than any other single factor on the future production, distribution and utilization of fuels.

Inasmuch as coal, petroleum, liquefied petroleum gas, and natural gas are in a sense different forms of carbon, it becomes obvious that, in many potential applications of these materials as fuel, the form value may markedly influence the economic justification for their use. These physical forms (solid, liquid and gaseous states) are important factors in determining the amount of investment necessary for production, transportation and utilization of these materials. Similarly, proximity to existing supplies of gas, oil or coal, especially when such fuels are available part of the time on an incremental cost basis, may result in uses based primarily on place utility. In such cases, comparative costs on a Btu basis alone may not be the decisive factor.

The importance of existing investments in producing, manufacturing and transportation facilities must be considered also. Underloaded gas transportation systems may be used to transport additional volumes of gas at very low costs since in such instances the only extra costs incurred are those for handling the additional volumes (the so-called incremental costs). In marketing of all types of fuel, intermittently available supplies can be sold at abnormally low rates, still realizing attractive profits. Such underloaded facilities may be employed to handle additional quantities of fuel or raw material for the normally less attractive markets or they may be used to support a new development. For example, in specific cases processing, facilities for natural gas and natural gasoline may enable one to lower overall costs of operation of a Fischer-Tropsch process for producing liquid fuel from natural gas. Likewise some war facilities may become useful in reducing investments for fuel distribution.

Consumption Rates

Present consumption rates of natural gas are at an all time peak as will be noted from the statistics of Table 1 which are presented graphically in Fig. 1. (6) (7)* Undoubtedly, the wartime peak of industrial activity is responsible for at least a portion of the increase noted for the last several years.

Industrial use includes all gas consumed in industrial establishments as fuel, as a source of power, and as a medium for the maintenance of controlled furnace atmospheres. It does not include the fuel consumed in commercial establishments, which volumes are included in the totals for domestic and commercial fuel. Industrial use also includes the small amounts of gas which enter chemical operations. No satisfactory information exists as to the exact amounts of gas entering the chemical field but, from available figures on the total production of organic chemicals, it can be concluded that the amounts so used are trivial in terms of total gas demand.

The volumes shown in Table 1 for domestic and commercial purposes cover fuel used principally for heating in domestic and commercial estab-

NATURAL GAS and petroleum reserves are larger today than at any other time in our history, despite the fact that recent consumption rates have been at an all-time peak. Furthermore, it is believed that there are more chances of research and development finding entirely new sources of energy or using the available energy in a radically different way than that in which gasoline is now being used, than there is that our petroleum resources will be exhausted within the next 100 years.

However, intelligent use of resources is required in order that there may be adequate supplies for use in any national emergency. Research and development work on more efficient conversion and utilization of liquid fuels from petroleum, natural gas, coal, and agricultural products should be continued.

The future prospect of the use of natural gas for fuel purposes is very bright. It is expected that as more value is placed upon this commodity and transportation facilities are increased, less natural gas will be used in the present low priced markets.

Natural gas as a raw material in the manufacture of chemicals is of considerable economic importance to the chemical industry, but the quantity of natural gas used for producing chemicals is and probably will continue to be relatively small in comparison to the amount used for other purposes.

Natural gas is a more economic raw material than coal for conversion to liquid hydrocarbons by the Fischer-Tropsch process. Modifications of the Fischer-Tropsch process, using natural gas, will undoubtedly find useful applications, particularly where the process can be combined with other processes or with existing facilities. The production of natural gasoline and the manufacture of chemicals afford opportunities for such combinations.

However, without the economic advantages of such combinations, the available information indicates that as a means of producing gasoline alone the Fischer-Tropsch process would not be competitive with present refinery operations, using crude oil as a raw material, under present prices. Furthermore, the peak of gasoline production from natural gas by the Fischer-Tropsch process will undoubtedly amount to only a minor proportion of the total gasoline supply of the nation. Our appraisal of the commercial possibilities of converting natural gas to liquid fuels, on the basis of our own research and results reported by others, leads us to be more optimistic than is warranted by any conclusive published data.—Author.

FUTURE PROSPECTS

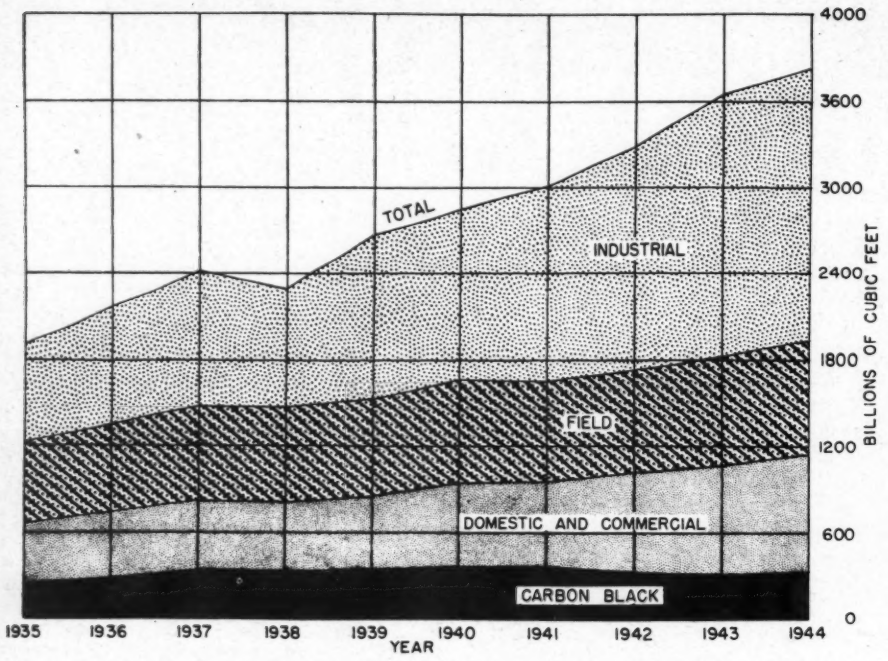


Fig. 1. Annual consumption of natural gas in the United States.

lishments. "Field" use of natural gas represents that used in field operations, which includes the generation of power for drilling, reconditioning and pumping wells, and other purposes. Volumes designated as "Carbon Black Plants" require no further explanation.

Using the 1944 figures as a basis, it appears that about 50% of the total volume of gas was used in industrial operations of various kinds, about 20% as domestic and commercial fuel, another 20 % in field uses at the sourse of the gas, and the balance, about 10%, in the carbon black industry.

Energy Percentages: Since the primary demand for natural gas is for fuel use, it will be of interest to examine briefly some statistics on the percentages of the total energy represented by the Btu contents of our principal fuels. In Fig. 2, there is reproduced some information from Fieldner's studies (3, 10) and subsequent data on fuels and water power for the years 1942 through 1944. All data are taken from published statistics of the U. S. Bureau of Mines (6) except the 1944 data for water power and coal which were obtained from the March, 1945, "Survey of Current Business".

As will be noted, the only fuel showing a decrease, in terms of the percentage of the total energy, is coal. In Fig. 2, the data are presented in terms of total energy content from each source, while in Fig. 3, the proportion of energy content supplied by each source is shown. If the depression years of the early '30's are ignored, it will be noted that the total Btu content from all sources has been rising steadily. On the same basis, it will be noted that total Btu content from coal has climbed back to its pre-depression level. The consistent increases in energy content from natural gas and petroleum are also of interest.

Since the increase in energy consumption was far more rapid than the increase in population during the period 1900 to 1944, variations in the amount of energy per capita were computed. It is interesting to note that the total energy per inhabitant in the United States in 1944 was approximately 2½ times that in 1900. Likewise, total energy for 1944 was approximately 1¼ times that for 1929. As seen from Fig. 2, natural gas and petroleum have shown a relatively steady increase in quantity of energy; on the other hand the total Btu content of coal produced in 1944 exceeded, for the first time, its all time peak which was established in 1928.

The increase in total energy made available by the production of natural gas and petroleum is traceable almost entirely to the development of adequate pipelines and to the uses of petroleum which have resulted from the development of automotive transportation. It is quite probable that an appreciable proportion of the pronounced increase shown for natural gas and petroleum is traceable to taking full advantage of existing investments, in production, processing, transportation, and distribution facilities. For example, underloaded pipe lines are a strong incentive for de-

TABLE I. ANNUAL CONSUMPTION OF NATURAL GAS IN THE UNITED STATES
1935 TO 1944, INCLUSIVE
(Millions of Cubic Feet) (a)

Year	*Industrial (d)*	*Domestic and Commercial*	*Field*	*Carbon Black Plants*	*Total*
1935	674,213	413,685	580,414	241,589	1,909,901
1936	803,660	454,969	618,468	283,421	2,160,518
1937	921,402	489,234	651,320	341,085	2,403,041
1938	827,876	482,068	659,203	324,950	2,294,097
1939	1,127,255	509,487	680,884	347,270	2,664,896
1940	1,178,862	578,290	711,861	368,802	2,837,815
1941	1,371,902	586,911	686,158	365,377	3,010,348
1942	1,544,773	682,140	721,063	335,533	3,283,509
1943 (b)	1,820,143	745,000	760,000	315,600	3,640,743
1944 (c)	1,898,143	810,182	792,000	328,200	3,828,525

(a) Marketed production only. Data for the years 1935 through 1943, inclusive, from "Minerals Yearbook", U. S. Department of Interior, Bureau of Mines.

(b) Reported by Bureau of Mines with the statement that the data are subject to revision.

(c) Estimated. Based on "Monthly Summary of Gas Company Statistics", issued April, 1945, by the Statistical Bureau of the American Gas Association, adjusted to give the above figures which are believed to be in line with the rates of increase indicated by the previous Bureau of Mines data.

(d) Includes petroleum refineries, electric power plants, cement plants, chemical use and other industrial use. Gas consumption in electric power plants includes natural and other fuel gas impossible to segregate.

veloping markets or securing loads which will result in utilizing the full capacity of existing systems.

It should be mentioned that both natural gas and petroleum, as a result of their advantageous physical form, have an inherent tendency to yield a higher thermal efficiency than coal. Improvements both in equipment and in method of handling coal have produced phenomenal improvements in thermal efficiency since 1900. For example, (3) the consumption of coal per kilowatt hours has been reduced from 7.05 lbs. in 1899 to less than 0.8 lbs. of coal per kilowatt hour in recent years, in the more efficient plants. Marketed production statistics of fuels and related materials for 1944 appear in Fig. 3.

Faced with these important background factors, none of which can be ignored, the future possible outlets for natural gas constitute an interesting field for conjecture. Since the primary use of natural gas has been as a fuel, and since, in this application there has been and apparently will continue to be a steady and uninterrupted increase in the volumes so utilized, the most immediate prospect is one of domestic and industrial load building.

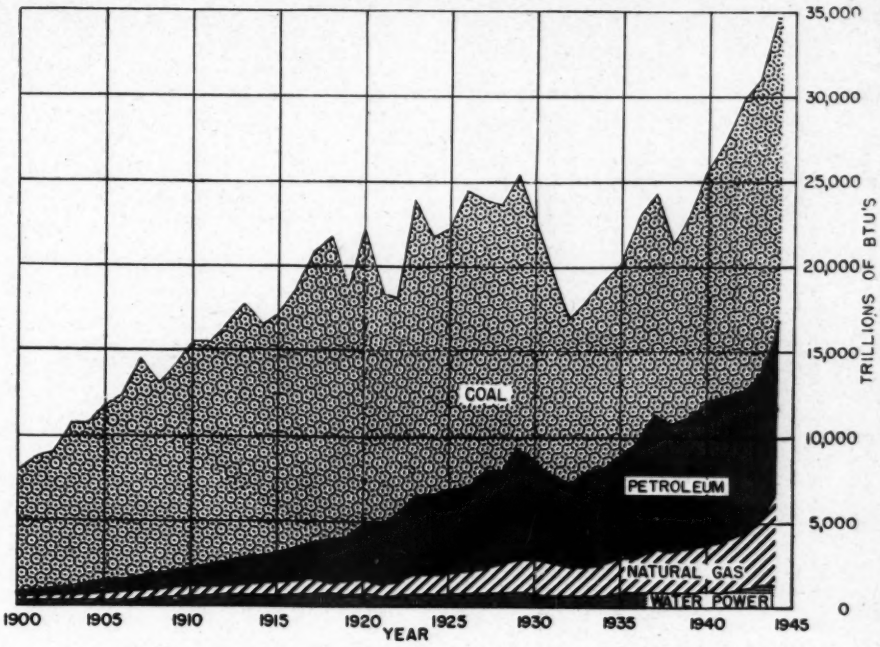


Fig. 2. Energy content of the minerals and water power used to supply annual demand.

Fuel Utilization

The Domestic Load: For the past ten years the domestic natural gas load has shown a consistent increase. During this period this load has increased 87%. The increase in 1944 over 1943 was 9.4%. During the last year the increase in number of customers was 2.8%. This greater percentage increase in gas load than in number of customers illustrates the generally accepted theory that natural gas is gaining in acceptance by its present users. One can immediately recognize the stability and strength of this load.

At the end of 1944 there were 8,578,000 domestic users of natural gas, the number having increased 16% since 1935.

An increasing domestic gas load can be expected as our population turns away from the many inconveniences and deficiencies of outmoded heating appliances. Expansion into the fields of gas-fired refrigeration, home freezers for quick-frozen food storage, space heating and water heating offer additional possibilities as domestic load builders. In some localities, even domestic air conditioning is now being commercialized.

However, gas will have competition for the expanded, domestic load, with the chief competitor in the fields of domestic refrigeration, cooking and water heating continuing to be electricity. It can be expected also that the use of the complementary fuel, liquefied petroleum gas, will be greatly extended in the domestic field, primarily in suburban areas and in localities where gas distribution facilities are not available. It is also expected that the use of the coal and fuel oil for general house heating in well-designed and efficient equipment, operating with a new high standard of cleanliness, will show a decided increase and may ultimately arrest the trend toward the use of gas for this purpose.

Industrial Fuel Prospects: The prospects for natural gas as an industrial fuel over the next several years appear to be bright since we are undoubtedly entering a period of extreme industrial activity. However, from a more distant viewpoint, the extension of natural gas use does not appear probable in those applications where the cost per heat unit is the prime factor. Those industrial loads where uniformity of fuel and close control of heating operations are of more importance than the cost per heat unit will undoubtedly be retained by natural gas and liquefied petroleum gas, and some further extensions

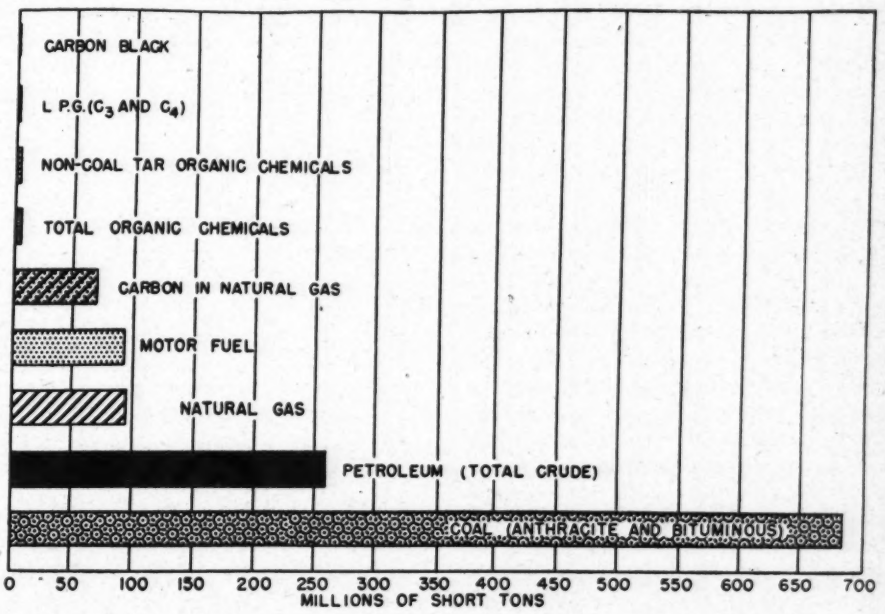


Fig. 3. Marketed production statistics of fuels and related materials for 1944.

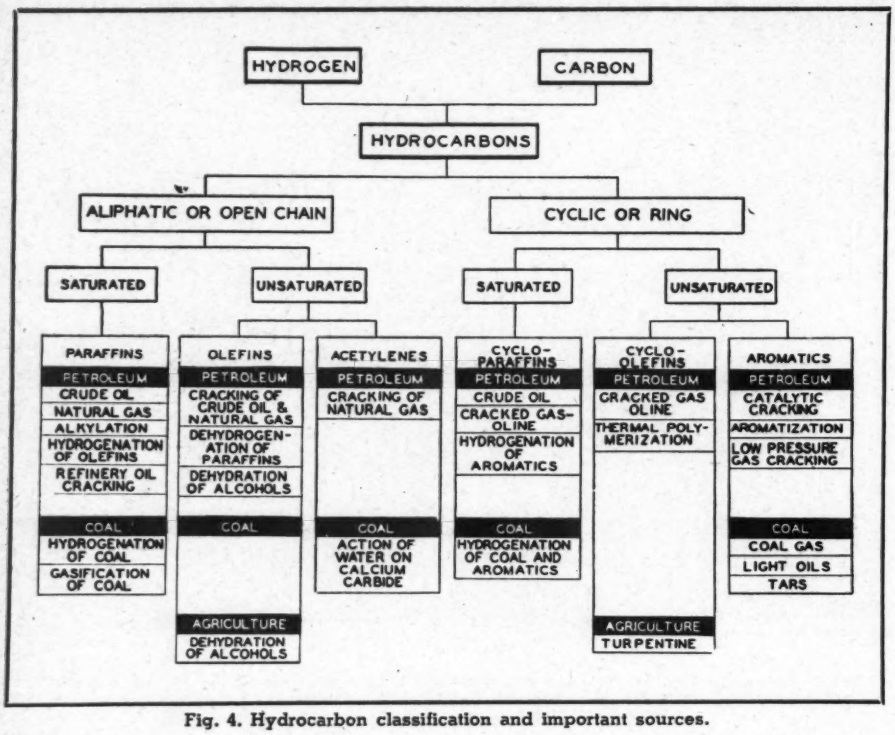


Fig. 4. Hydrocarbon classification and important sources.

can be expected in the future.

Carbon Black: The production of carbon black from natural gas is, and probably will continue to be, a transient use for this raw material confined mainly to the early life of gas fields and to those fields where pipe line outlets for fuel gas are inadequate. The present use of gas for carbon black manufacture may be expected to decrease gradually in favor of the more profitable fuel markets.

Of interest in this connection is the recent development on a commercial scale of an extremely flexible carbon black process which employs fuel oil and other liquid hydrocarbons as the starting material and which produces a much wider variety in quality of blacks than is possible by other well known processes. The success which the product of this process has met in various carbon black applications gives us reasonable assurance of a source of carbon black when gas no longer will be available for its production at prices that will enable its present wide use.

As a Chemical Raw Material: Much publicity has been given the postwar possibilities of chemicals, particularly the organic chemicals. Since the organic chemicals are "carbon chemicals", it follows that petroleum, natural gas, coal, agricultural and forest products are the primary raw materials. Extensive progress has already been made in the manufacture of chemicals from petroleum, and a substantial part of this progress has been accomplished by companies interested more in chemicals than in petroleum products. Strictly speaking, all compounds are chemicals, but the petroleum industry is rapidly beginning to think of chemicals as all of those new products from petroleum which are not used as fuels or lubricants.

As the principal products of the petroleum industry are fuels and lubricants, the majority of oil companies have, until recent years, directed their chemical research primarily to the manufacture of these products. Consequently, the majority of the new processes developed in the refining industry have been based to a steadily increasing degree on chemical reactions. Obviously the introduction of chemical knowledge in refinery technique will intensify the interest of refiners in the manufacture of chemicals.

But more important than this is the abundance and variety of chemical raw materials resulting from the production and processing of oil and natural gas. Furthermore, many of the hydrocarbon raw materials available in the petroleum industry are in effect by-products of the many processes which are used by the refining industry, and for this reason they are ordinarily cheaper than raw materials from other sources. These facts are going to be important factors in the further development of chemicals from petroleum or natural gas.

In Fig. 4 is shown a skeleton diagram of the hydrocarbon family. The diagram presents the manner in which the chemist classifies the hydrocarbons and shows where they are found or produced.

In considering the manufacture of a chemical, the "conversion" state of the raw material to be used in the process is an important economical factor. All other things being equal. the less the number of steps through which the chemical raw materials must pass before emerging as a finished chemical product, the simpler ,and more economical will be the manufacturing process.

An example of the manufacture of gasoline from coal will illustrate this point. Suppose we desire to make gasoline and we have two sources of raw material available; namely, coal and crude oil. Gasoline is a hydrocarbon liquid. If we manufacture gasoline from coal, we must first convert coal to a hydrocarbon liquid by a very complicated and very costly process known as hydrogenation, in which the cost of making hydrogen alone is a very important factor. After we make the liquid hydrocar-

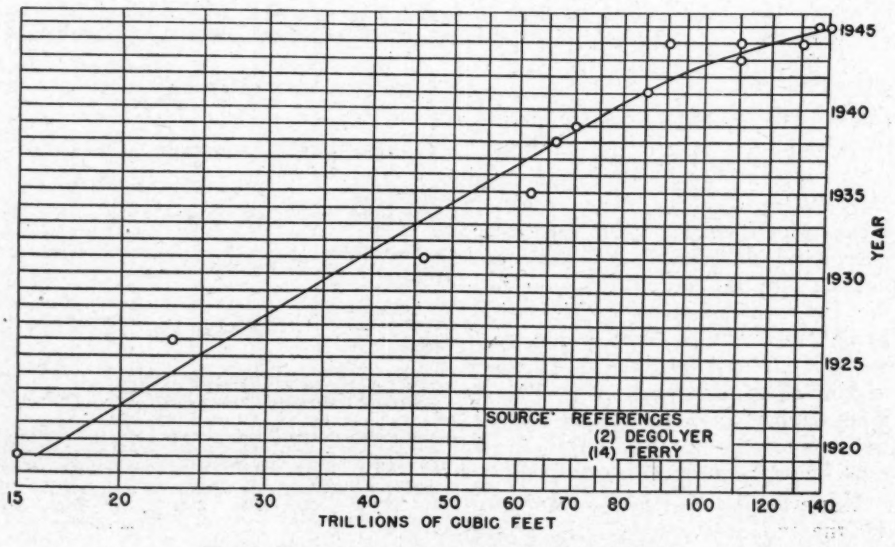


Fig. 5. Natural gas reserves in the United States.

bon mixture from coal by the costly process just mentioned, we must then do the same thing as is done with crude oil, that is separate it into the desirable and undesirable fraction and subject it to any further necessary processing.

Thus it is easily seen that petroleum as a source of gasoline, process-wise, is two steps ahead of coal, which must be converted into synthetic crude oil by two steps: first, that of manufacturing hyrdogen and, second, that of hydrogenating the coal. A similar line of reasoning applies to natural gas as a preferred raw material, as compared with coal, for producing liquid fuel by the Fischer-Tropsch process.

The manufacture of chemicals from oil and natural gas is certain to increase, and the petroleum companies will undoubtedly place more and more emphasis on this activity. However, the manufacture of chemicals, as compared with the manufacture of fuels and lubricants, calls for a different type of operations, characterized in particular by small quantities, higher investments, higher costs, higher research budgets, a higher degree of technical skill, and a higher obsolescense of process and product; that is, shorter life of process and product.

Considering these differences, it is evident that the petroleum refiner may find it more expedient to manufacture intermediate raw materials for the chemical companies than to manufacture the finished chemicals. This is a procedure which is already being followed to a great extent. Many of the chemical companies have located their chemical plants adjacent to refineries on account of the cheap and abundant supply of by-product raw materials and on account of the widespread location of refineries throughout the United States, which affords another economic advantage, namely, that of nearness of raw material to the markets for the finished chemical products. This is a trend which no doubt will continue until other economic factors change the picture.

Chemical Products: With the exception of synthetic fuels used primarily in aviation gasoline, the largest recent interest in the chemical field has been in synthetic rubber. The production of this material in 1944 was about 750,000 tons. Other products now manufactured in appreciable volumes from petroleum and natural gas hydrocarbons include the familiar antifreeze compounds, solvents, explosives, alcohols, and a veritable host of derivatives which constitute starting materials for many other products.

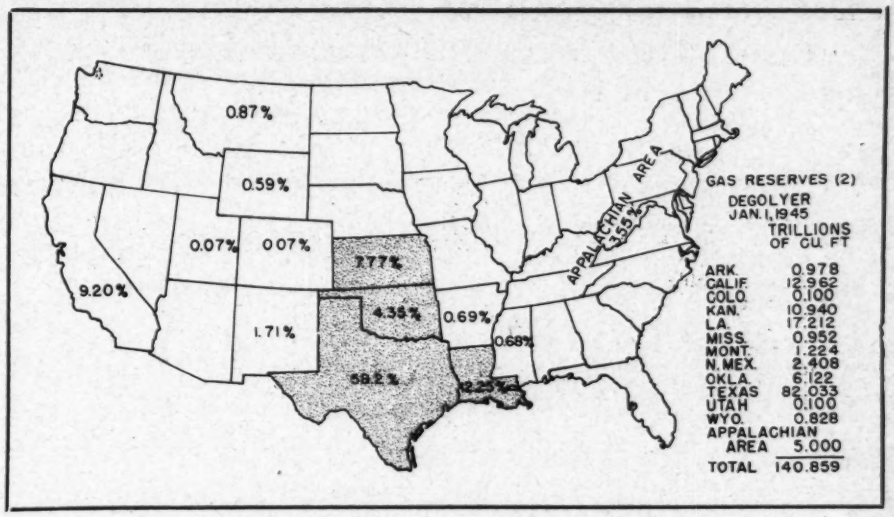


Fig. 6. Distribution of the proven natural gas reserves.

The viewpoint of the chemists on these various developments is that the surface has barely been scratched and that further researches will bring quick results in the preparation of new and useful chemical derivatives from petroleum materials. The possibilities in the new field of synthetic plastics alone promise to make all the other petroleum chemical developments to date appear small by comparison.

Limitation of the Chemical Field: Lest the impression be left that the chemical field is an unlimited one so far as market outlets for large volumes of raw materials are concerned, it is well to point out how relatively small such outlets generally are for these raw materials. Thus it was calculated recently that the entire 1944 production of wood alcohol could have been produced from a single gas well of 15 MMcf daily capacity if near perfect conversion efficiencies were obtained. This means that the potential production, if realized, from only one of our larger gas wells would have completely supplied this whole market.

Similarly, if all of the ethane and ethylene present both in the gases at refineries and in the raw natural gases during 1944 had been converted to ethyl alcohol (generally called grain alcohol), the production of ethyl alcohol would have amounted to about eight times the total requirement estimated for 1944 and 40 times the amount of ethyl alcohol produced in 1940. If the entire potential supply of normal butane in 1944 had been used to produce butadiene for the manufacture of synthetic rubber, the amount of butadiene thereby manufactured, under present conversion efficiencies, would have been four times its demand.

Summarizing, it is interesting to note that the chemical uses today represent considerably less than 1% of the total natural gas consumed, this volume being of about the same order of magnitude as the unavoidable losses occurring under the most efficient operations encountered in the best engineering and safety practices of the industry, using the most advanced technology. Thus the manufacture of chemicals does not promise to create any large volume of sales of natural gas.

Liquid Fuel Manufacture: Another possibility of a new outlet for natural gas is in the conversion of dry natural gas into liquid fuel hydrocarbons by means of the so-called Fischer-Tropsch process. The large mass of information which has been accumulated, as a result of research and development both here and abroad, permits a rough estimate of the process as a means of gas utilization.

Although the conversion of natural gas may be important from the standpoint of augmenting raw materials for liquid fuel manufacture at costs not far from present costs, it cannot be considered an ultimate solution of the question. In short, the utilization of natural gas for hydrocarbon synthesis represents an "intermediate", but important, process and as such has greater immediate interest than coal.

Modifications of the Fischer-Tropsch process, using natural gas will undoubtedly find useful applications, particularly where the process can be combined with other processes or with existing facilities. The production of natural gasoline and the manufacture of chemicals afford opportunities for such combinations. However, without the economic advantages of such combinations, the available information indicates that as a means of producing gasoline alone the Fischer-Tropsch process would not

TABLE 2. PROVEN RESERVES OF NATURAL GAS, CRUDE OIL AND COAL AS OF JANUARY 1, 1945

	Weight	*Heat Value*	*Volumes*	
	(Thousands of Short Tons)	*(Trillions of Btu)*	*(Trillions cu. ft.)*	*(Millions of Barrels)*
Natural Gas (a)	3,384,500	150,000	140	.....
Crude Petroleum (b)	3,135,000	123,000	.....	20,453
Coal (Suitable for (Fischer-Tropsch)	1,400,000,000	36,400,000		
Coal (all grades) (c)	3,178,000,000	66,534,000	.....	

(a) Reference (8), Assume 1075 Btu per cu. ft. and 48.35 lb. per M cu. ft.
(b) Reference (7), Assume 6,000,000 Btu per barrel and 7.3 lb. per gallon.
(c) As of Jan. 1, 1942 Reference (9). Corrected to an equivalent amount of coal, (2,559,000,000,000 tons) with a heating value of 13,000 Btu/lb. (9).

be competitive with present refinery operations, using crude oil as a raw material, under present prices. Moreover, the peak gasoline production from natural gas by the Fischer-Tropsch process will undoubtedly amount to only a minor proportion of the total gasoline supply of the nation.

Our appraisal of the commercial possibilities of converting natural gas to liquid fuels on the basis of our own research and results reported by others, leads us to be more optimistic than is warranted by any conclusive published data.

Fuel Reserves

In the preceding discussions we have assumed adequate reserves of natural gas. We will now give this subject of reserves further consideration. Fig. 5 gives the estimated gas reserves in the United States from January 1, 1919, to January 1, 1945, inclusive. As seen in Fig. 6, Louisiana, Texas, Oklahoma and Kansas are credited with some 83% of these reserves. The proven reserves of natural gas, petroleum and coal as of January 1, 1945, are presented in Table 2 (1, 2, 13, 14) in terms of volumes, weights, and also on a thermal basis.

Such reserve figures do not take into account the effect of future advances in the science of exploration and the advantages to be gained through deeper drilling, nor to the possible opening up of new areas which will undoubtedly occur whenever the demand for new supplies becomes evident.

The repeated forecasts made over the past 20 or 30 years indicating the early exhaustion of petroleum and natural gas deposits and the actual reserve history over this period are a good indication of how inaccurate such forecasts can be. In each instance, the new exploration activities, which resulted from a persistently increasing demand, effected an increase in the proven reserves which are now greater than at any time in the history of the industry. The fact that such additional reserves could be found while the industry was engaged in supplying a peak demand for gas and oil during the past world war period should give us some assurance that adequate supplies will be available for all of our needs for many years to come.

Any discussion of reserves, of necessity, must be based on various assumptions which may or may not appear reasonable. If we do not expect any new industrial developments and could consider our present fuel consumptions as constant, we could predict the expected life of petroleum and natural gas resources based on our past history.

It has been frequently stated that our crude oil reserves will last only about 15 years at present rate of consumption. Using present crude oil production methods we recover less than one-third of the oil present in the reservoir; we convert less than one-half of that recovered oil into gasoline; and we translate considerably less than one-fourth of the energy of that gasoline into useful work. If we doubled the efficiencies of recovery of oil, doubled the yield of motor fuel manufacture, and finally doubled the efficiency of utilizing the fuel in the engine, we could make one barrel of oil reserves last as long as eight barrels of oil reserves at the present rate of consumption. If this were done, our present known reserves of oil would last not 15 years, as many have stated, but more than 100 years, as far as requirements of the internal combustion engine are concerned.

In my opinion there are more chances of research developing within the next 100 years entirely new sources of energy or using the available energy of present fuels in a radically different way, resulting in a surplus of crude oil, than there are that our petroleum resources will be exhausted in less than a century. The best answer to the problems of magnitude and longevity of petroleum reserves is to be found in higher prices for crude oil and gasoline which would not only result in the discovery of more crude oil reserves and promote the efficiency with which they are utilized, but would also enable coal to regain its lost markets.

If natural gas were used at the estimated 1944 rate of consumption our proven gas reserves would last a little over 35 years. Yet we know that a large amount of the gas used was sold at very low prices only because there was no higher price market available. Therefore, we can state quite assuredly that as higher price markets for natural gas are developed, or greater value is placed on this material, the low price markets such as carbon black, natural gas for power, and low price industrial uses will disappear. Such being the case, I am firmly of the opinion that our natural gas resources will not be exhausted prior to those of crude oil.

BIBLIOGRAPHY

1. "Minerals Yearbook", United States Department of Interior, Bureau of Mines, 1937 to 1943, inclusive.
2. "Monthly Summary of Gas Company Statistics," by the Statistical Bureau of the American Gas Association, April, 1945.
3. "Fuels of Today and Tomorrow", by Arno C. Fieldner, ASTM 40th Annual Meeting, Waldorf-Astoria Hotel, New York City, June 28, 1937.
4. "Recent Developments in Fuel Supply and Demand" by Arno C. Fieldner, U. S. Department of Interior, Bureau of Mines, Information Circular No. 7261, Nov., 1943.
5. "Survey of Current Business," United States Department of Commerce, Bureau of Foreign and Domestic Commerce, March, 1945.
6. Annual Statistics of the Natural Gas Utility Industry in 1944. A.G.A. Statistical Bulletin, No. 59, October, 1945.
7. Data published by American Petroleum Institute.
8. "Estimate of U. S. Gas Reserves", statement of E. DeGolyer to Senate Committee on Investigation of Petroleum in Relation to the National Welfare, Washington, D. C.
9. "Synthetic Liquid Fuels". Hearings before a Subcommittee on Public Lands and Surveys, United States Senate, Seventy-Eighth Congress, First Session on S. 1243, U. S. GPO Washington, D. C., 1944.
10. "Our Natural Gas Reserves" by Lyon F. Terry, Natural Gas Spring Conference, A.G.A., French Lick Springs, Ind., May 12, 1944.

FPC Elects Olds Chairman and Smith Vice Chairman

On Dec. 14 Leland Olds of New York was elected chairman of the Federal Power Commission for the remainder of his present appointment, which expires June 22, 1949. The Commission also elected Commissioner Nelson L. Smith of New Hampshire its vice chairman for 1946.

Olds has been a member of FPC since 1939, serving as chairman from January 1940 to June 1944, and since September 1944 as vice chairman. In resuming his duties as chairman, Olds succeeds Basil Manly, who resigned. Smith was appointed a member of the FPC in October 1943 and since September 1945 has been supervising commissioner of the nation-wide Natural Gas Investigation (Docket No. G-580).

REVIEW AND PREVIEW

By E. J. BOOTHBY

President, American Gas Association

Vice-President, Washington (D.C.) Gas Light Company

DURING the year 1945 the gas industry completed its enviable record in war effort and stood ready to meet the challenge of peace. The transition from a war-time to a peace-time economy was made with a minimum of dislocation and a maximum of efficiency. The industry continued to demonstrate the leadership of gas as the ideal fuel for residential, commercial and industrial use.

Statistics

Customers of the gas utility companies numbered 20,156,000 at the end of 1945. This is the largest number in the history of the industry and represents an increase of 1.9% over the 1944 figure. Of this total, manufactured and mixed gas companies served 10,659,000 and natural gas companies served 9,497,000.

Revenues of the entire industry approximated $1,141,374,000 — an increase of 3% over 1944. Natural gas revenues totaled $692,526,000 and manufactured and mixed gas companies $448,848,000.

Natural gas residential sales* increased 6.4%; while industrial sales declined approximately 3.5%. Total marketed production of natural gas in 1945 was 3,689,200,000.

Manufactured and mixed gas residential sales* increased 3.9%; commercial 14%; while industrial sales declined 4.2%.

*Residential sales include gas used for househeating and other residential purposes.

Residential Gas

Manufacturers of domestic gas appliances during the second half of 1945 began rebuilding their engineering and research staffs as returning veterans became available. New domestic gas appliances will represent the ultimate in modernity, efficiency, convenience and economy, incorporating improvements determined by surveys made by the Association and leading consumer magazines.

The largest program of research in the domestic utilization field ever undertaken by the gas industry as a whole was carried out by the American Gas Association in 1945. The program will be still further expanded during 1946. There were a total of 21 projects active during the year and covered a range of technical subjects from automatic flash tube oven and broiler lighting to studies that will eliminate all traces of noise of extinction of burners in furnaces that heat homes.

1945 American Gas Association domestic research projects were carried on at the A. G. A. Testing Laboratories, Institute of Gas Technology, Case School of Applied Science, Battelle Memorial Institute and Purdue Research Foundation.

Industrial and Commercial Gas

Industrial gas sales were at an all-time peak during the war period. Curtailment of war production decreased this volume somewhat in 1945 below the previous year, but industrial gas is playing an important part in the nation's reconversion program. Further advances in industrial gas utilization were made and new equipment designed and installed incorporated many features resulting from war production experience.

Research and development of industrial furnaces, under the urgency of war requirements, have been greatly expanded and performance has again demonstrated that "it can be done better with gas".

At the close of the year the back log of orders for industrial gas equipment is substantial. The automobile industry, for example, is installing paint drying and finishing ovens for bodies, that are heated with the newer types of gas air heaters, of a far greater total capacity than before the war. As fast as materials can be secured the ceramic industry has been installing furnaces and kilns heated with the new high temperature radiant burners. Special machines that incorporate the newer types high speed, direct gas burners have played a prominent part in the reconversion of many production heat treating shops. Industrial gas departments have been reorganized and enlarged to give better engineering services.

The use of commercial gas during 1945 was the most extensive in history. Restaurant, hotel and other public eating establishments comprise the most important sector of commercial gas uses. Not only did more people eat more meals away from home than ever before, but the increased quantities of food cooked had to be prepared on equipment installed to meet only the prewar loads. Restaurant and hotel proprietors throughout the country

POINTS OF PROGRESS IN 1945

- **A new Publicity Bureau was established by the American Gas Associates and regularly distributes news items on the progress of the gas industry.**
- **Financial Statistical data on the gas industry was furnished to the leading financial orgnizations in the country. News of the Research and Promotional program has been favorably received by the financial world.**
- **The Association's statistical bureau, strengthened in 1945, will in the near future furnish special economic and market studies for the use of the industry and financial institutions.**
- **Industrial relations problems received increased attention. Conferences were held in several sections of the country attended by industrial relations executives. These conferences aided in maintaining operating forces under war conditions and in interpreting government regulations affecting personnel. After V-J Day attention was directed toward providing satisfactory reemployment of returned veterans.**
- **The Rate Committee of the American Gas Association continued the study of the best types of rates to be applied to various classes of consumption. Their findings will be of much value during the postwar period.**
- **H. Carl Wolf, former president of the Atlanta Gas Light Co., was appointed Managing Director, following the retirement of Major Alexander Forward after 22 years of service. Wolf is well equipped and will play an important part in directing the vastly expanded program of research, sales promotion and advertising and also in administering the general affairs of the Association.**

PRELIMINARY ESTIMATES—TOTAL MANUFACTURED, MIXED AND NATURAL GAS—1945

CUSTOMERS

	1945	1944	Per cent Change
Total	20,156,000	19,772,000	+1.9
Residential*	18,966,000	18,640,000	+1.7
Commercial	1,084,000	1,031,000	+5.1
Industrial	94,000	89,000	+5.6
Other	12,000	12,000	—

REVENUES

Total	$1,141,374,000	$1,108,157,000	+3.0
Residential*	721,830,000	689,683,000	+4.7
Commercial	131,532,000	122,020,000	+7.8
Industrial	279,214,000	288,433,000	—3.2
Other	8,798,000	8,021,000	—

PRELIMINARY ESTIMATES—NATURAL GAS—1945

CUSTOMERS

	1945	1944	Per cent Change
Total	9,497,000	9,270,000	+2.4
Residential*	8,772,000	8,578,000	+2.3
Commercial	665,000	635,000	+4.7
Industrial	58,000	55,000	+5.5
Other	2,000	2,000	—

SALES (Mcf)

Total	2,148,925,000	2,156,897,000	—0.4
Residential*	594,243,000	558,511,000	+6.4
Commercial	186,111,000	179,558,000	+3.6
Industrial	1,326,265,000	1,374,134,000	—3.5
Elec. Gen.	330,386,000	352,015,000	—6.1
Other Ind.	995,879,000	1,022,119,000	—2.6
Other	42,306,000	44,694,000	—

REVENUES

Total	$ 692,526,000	$ 676,686,000	+2.3
Residential*	377,535,000	358,251,000	+5.4
Commercial	76,706,000	73,140,000	+4.9
Industrial	231,961,000	239,553,000	—3.2
Other	6,324,000	5,742,000	—

PRELIMINARY ESTIMATES—MANUFACTURED AND MIXED GAS 1945

CUSTOMERS

	1945	1944	Per cent Change
Total	10,659,000	10,502,000	+1.5
Residential*	10,194,000	10,062,000	+1.3
Commercial	419,000	396,000	+5.8
Industrial	36,000	34,000	+5.9
Other	10,000	10,000	—

SALES (Mcf)

Total	491,339,000	476,342,000	+3.1
Residential*	311,604,000	300,045,000	+3.9
Commercial	65,055,000	57,089,000	+14.0
Industrial	110,454,000	115,267,000	—4.2
Other	4,226,000	3,941,000	—

REVENUES

Total	$ 448,848,000	$ 431,471,000	+4.0
Residential*	344,295,000	331,432,000	+3.9
Commercial	54,826,000	48,880,000	+12.2
Industrial	47,253,000	48,880,000	—3.3
Other	2,474,000	2,279,000	—

*Includes house heating

Statistical Bureau, American Gas Association, December 3, 1945

have praised the performance of heavy duty gas cooking and baking equipment during this trying period.

A.G.A. Testing Laboratories

Major emphasis was again devoted to war service the past year principally on automatic oxygen regulators for transport planes. These were developed, designed, and tested by the Laboratories. Approximately 40,000 of these regulators were furnished to the Air Forces, while in addition some 6000 were repaired. The Laboratories also produced portable indicating instruments used in fire control equipment.

Research endeavors high-lighted the Laboratories investigational activities. Technical aspects of six domestic gas research projects were completed and bulletins thereon were compiled. Regional conferences were held in Cleveland, Chicago, New York and Los Angeles.

Rehabilitated aud re-equipped, the Laboratories are in excellent position to assist the gas industry in its reconversion problems.

New Freedom Gas Kitchen

The New Freedom Gas Kitchen program, initiated to increase acceptance of gas service in modern homes gained impetus during the year. The program has been presented directly or through utility company contacts in every state in the nation and in Canada. Inquiries concerning the program have been received from England, France, New South Wales, Venezuela, Argentina and Brazil.

Cabinet makers and appliance manufacturers have cooperated in the program or have initiated campaigns of a like nature. Plans for dimensionally coordinating kitchen cabinets have been agreed upon by manufacturers of wooden and steel cabinets. Outdoor posters and window displays have been made available to gas utility companies featuring New Freedom Gas Kitchens.

Home Service Activities

The Home Service department of the gas industry continued active participation in war-time programs of nutrition, and food conservation. Special attention was given to the governnment school lunch program and the campaign for better breakfasts. In the food preservation program gas companies handled thousands of requests for recipes and directions to augment the limited sugar supply. Indications are that millions of quarts

of food were preserved under the supervision of the Home Service departments of the gas and utilities companies.

Government sources recognized the facilities of gas companies in directing information to many city women not otherwise reached and directed many releases specifically to Home Service departments.

Demonstrations featured since V-J Day have centered around the brides of returning servicemen, also classes in nutrition held for school children. Kitchen planning has also received the full support of Home Service departments.

Research and Promotional Plan

History has recorded the first fiscal year (Oct. 1 1945) of the industry's research and promotional operation. Net subscriptions totaling $1,075,330 were received from gas and pipeline companies in the United States and Canada. An additional subscription of $160,000 to be applied to the National Advertising Program was received from more than 150 gas appliance and equipment manufacturers.

The Research and Promotional plan contemplates the expenditure of $1,000,000 collected annually over a three year period for research, national advertising and promotional effort in addition to normal activities financed through the American Gas Association membership dues and to that portion of the National Advertising Program being financed through direct contribution to that fund. Of this additional $1,000,000 per year, $600,000 is set aside for research, $200,000 for addition to the national advertising fund and $200,000 for general promotional activities. The funds collected under the plan are controlled by a special committee responsible under the general supervision of the Executive board of the Association to the contributing companies. The committee makes allocations only on the recommendation of four major committees. The Committee on Coordination of Research, the Production Research Committee of the Manufactured Gas Department, the Promotional Committee and the National Advertising Committee.

During the first fiscal year of operation of the plan, there was authorized a total expenditure of $463,402. A balance amounting to $611,928 is available for future expenditure. Although the fiscal year commenced Oct. 1, 1944, the funds were not available until March 1, 1945. The plan, therefore, actually operated only in the seven months ended Sept. 30, 1945. It is estimated the total subscriptions for 1946 will approximate $1,160,000. Expenditures will approximate $743,000 for research, $200,000 for promotion, $200,000 for national advertising and $17,000 for miscellaneous.

A promotional director is now initiating a comprehensive and well integrated program which will be coordinated with the promotional activities of individual gas companies, their dealers and all related industries.

National Advertising

The gas industry has just entered upon its tenth consecutive year of national advertising with an appropriation of $872,000, an increase of 60% over 1944, of which the manufacturers of gas appliances and equipment contributed $160,000. Consumer advertising featured the latest trend and advances in kitchen design and planning. This campaign will be supplemented by the addition of a new series on major gas appliances and important recent developments in the field of domestic cookery, including comfort-conditioning of kitchens through new ventilation systems developed by gas industry research. National magazines carrying such advertising have a combined circulation of 45 million, and represent approximately 20 different publications.

An enlarged budget for industrial and commercial advertising will make possible the coverage of a number of important fields. Appearing exclusively in trade and college publications, the 1945-46 program has been designed to maintain industrial and commercial gas in its present strong position of leadership. Approximately 62 different publications will be used.

A substantial increase in the use of newspaper advertising space by local gas companies, a tie-in with the Association's national advertising program, was evident during the year. The volume of newspaper mats sold to gas companies established a new record.

Natural Gas Expansion

During the year the natural gas industry has expanded its facilities to meet constantly increasing demands. Extensions have been made in a number of cities and transmission lines from Texas to Ohio, Western Kansas to Michigan, and Texas to California are now in process of government review. They are to supplement the existing supply.

New projects have been approved for increasing deliveries to the Appalachian region and are contemplated for the Chicago area. Continued exploration and development have kept the reserves of natural gas abreast of demands, reserves now being estimated at between 150 and 200 trillion cubic ft., assuring a supply for more than 30 years.

History is about to record a new era. It is sure to be one of the most interesting in all history. What it will bring in world economic conditions is not known but the gas industry is prepared. We have the unified effort of all those interested. We have the active support of each member of the Association. There can be but one result—our industry will function in a manner of which we all will be justly proud.

Wisconsin Gas Companies Fight to Expand Services

The introduction of natural gas in Wisconsin gained another supporter when the Madison council committee recently voted 16 to 1 in favor of it. The Federal Power Commission will hold a hearing in Washington Jan. 8 on the applications of the Madison Gas & Electric Co. and other Wisconsin utilities for permits to introduce natural gas into the communities they serve.

The FPC recently refused to reconsider its order of Sept. 7 permitting the Wisconsin Southern Gas Co. to serve its customers in southeastern Wisconsin with natural gas. The Commission said no new facts were presented by the petitioners, including the Wisconsin Railroad Association, Wisconsin Coal Bureau, Inc., and three other organizations.

Completion of the Wisconsin Southern Gas Co. natural gas pipeline south of Genoa City is not expected until spring, according to C. A. Altenbern, general manager. "Delaying tactics" of outside interests and approach of winter make it impossible to clear up difficulties before spring.

Indiana Seeks to Regulate Direct Industrial Sales

In an opinion of importance to the natural gas industry, the Indiana Public Service Commission has ruled that the state has the authority to regulate direct industrial sales of natural gas in Indiana.

The opinion was handed down in the case of Panhandle Eastern Pipe Line Co., which sells gas directly to the Anchor-Hocking Glass Corp., located in Indiana. As a result, the Commission has ordered Panhandle to file with it tariffs covering rates, rules and regulations relative to its direct industrial sales, annual reports, etc.

Gas Course Offered

Dr. Henry T. Heald, president of Illinois Institute of Technology, announces the establishment of a "Training Within Industry" program designed to service industries in meeting needs for engineers and supervisors. Prof. A. G. Giles has been appointed coordinator of extension courses.

Building

GAS WATER HEATER LOAD

With the Electric Laundry and Dishwashing Machine

EVERY MINUTE that a hot water faucet is kept open, the gas load is increased by 3570 Btu—if that faucet is connected to an automatic gas water heater. Two valuable allies of the gas industry in keeping those faucets open are electrical appliances—the automatic laundry and the automatic dishwasher. In this article, Mr. Rohde brings out a number of ways in which the gas industry and its salesmen can use these electrical allies to good advantage. The paper was presented before the Mid-West Gas Conference and School, Iowa State College, Ames, Iowa, in October 1945.

By G. M. ROHDE, Jr.

Ruud Manufacturing Company

THE load building value of the automatic gas water heater, together with its excellent load factor, makes it an appliance very desirable to any gas company. Every minute a hot water faucet is kept open, the gas load is increased by 3570 Btu, provided, of course, that the faucet is connected to an automatic gas water heater instead of another fuel. When one multiplies 3570 Btu by the number of minutes per day that the customer will keep the hot water faucets open if hot water is available at the right temperature and quantity, one can begin to see some interesting load-building possibilities.

Two electrical appliances are now on the market that will increase gas revenue from water heating if they are supplied with extra quantity of hot water at correct temperatures to make them operate at top efficiency. These electric appliances are (1) the automatic electric dishwasher and, (2), the automatic electric laundry machine.

The hot water requirements of these machines demand automatic water heating. These electric appliances open a new era that does more to obsolete the furnace coil, bucket a day, and oil coils, than everything done in the past. Let me quote from the service manual of an automatic electric laundry machine manufacturer:

> "Auxiliary systems, such as furnace coils, solar or other indirect methods, are seasonal and otherwise frequently undependable and cannot be considered satisfactory."

Whether or not the gas industry will take advantage of this opportunity, depends upon the attitude taken regarding the hot water requirements of these electric machines. If the industry says, "gas can't heat water that hot," "We've got a lime problem," "We've got a corrosion problem," then expect the hot water solution to the hot water requirements of these electric appliances to come in the form of electric water heaters or oil automatics.

The lime problem need no longer be a handicap to anyone wanting higher water temperature. Hexametaphosphate, commercially, known as "Micromet," is one way to solve the lime problem. Purdue Bulletin No. 74, "Scale Formation In Water Heaters and Methods of Prevention," is one that every gas man should get because it is the most complete study of lime and its effect on gas water heaters, ever published.

On the subject of corrosion, manufacturers will have available heaters built to withstand the corrosive action of hot water at temperatures required for these automatic electric appliances.

Laundry Research

The public clamor for this machine and the lack of information on correct water temperature for washing clothes, has caused two outstanding colleges in the country to undertake studies on the subject of washing. Virginia Polytech Institute has just completed their project and Penn State College under the direction of Dr. Pauline Berry Mack, is conducting the most comprehensive study of washing ever undertaken. Penn State has been working with commercial laundry associations and it's well qualified to run a study of this kind.

Speaking of laundrying of cottons and linens, such as bed sheets, pillow cases, white shirts, work shirts, towels, handkerchiefs, or in other words, the bulk of the wash, Virginia Polytech Institute report shows that, regard-

SOME THINGS A GAS COMPANY CAN DO TO CAPITALIZE ON THE VAST PROMOTION OF THE AUTOMATIC ELECTRIC LAUNDRY MACHINE AND AUTOMATIC ELECTRIC DISHWASHER.

1. **Have a laundry machine and a dishwasher connected on the sales floor with an automatic gas water heater of sufficient capacity. This should be a real live demonstration, set up with meters and thermometers, to show people how much and how hot the water should be.**
2. **Call on all automatic electric laundry machine and dishwasher dealers and have a plan whereby you will service the gas water heaters where they install these appliances in order that the customer can get the correct water temperature, etc.**
3. **Explain and demonstrate how improper piping affects the washing efficiency of the machines.**
4. **Make the gas company the headquarters where anyone can come to get all of the real, unbiased truth on hot water requirements for these machines.**
5. **Display Virginia Polytechnic Institute Charts that prove "The Hotter the Water, the Whiter the Wash," and "It Costs Money to Save Hot Water by using extra soap instead of extra hot water."**

If you do these things you will render a service to your customers and, in doing so, increase your gas load and public relations.

less of the type or make of machine tested, "The hotter the water, the whiter the wash." This may startle some, but, of course, we're not talking about the dainties washed in the bathroom. Many washer people will be out, as well as soap people, saying that their machine or soap saves hot water. Hot water cannot be saved without sacrificing cleanliness.

Some automatic machines have the advantage of being able to use hot enough water to simulate commercial laundry procedures and in so doing, according to Pennsylvania State College Bulletin No. 4, make the clothes free from pathogenic bacteria. Soapy water of 110° and 120°, according to this bulletin, does not accomplish this.

Conventional type washer manufacturers advertise the fact that water can be used over and over again, whereas a sanitary feature of the automatic machine is that fresh, clean, hot water is used with each batch of clothes. Many clothes dried by centrifugal force in the automatic laundry machine, need not be ironed. A recent survey shows that 47% of the homes surveyed in Western Pennsylvania, boiled their clothes before placing them in the conventional washer. So-called saving of hot water is expensive according to results from Virginia Polytech Institute.

According to Virginia Polytech Institute:—

Increasing the water temperature alone 40° *extra*, produced 26% *extra* whiteness for less than 1.4c extra for gas. (.35 natural gas at 50c m.c.f.)

Leaving the water temperature alone at 120°, but adding 50 grams of extra soap (F-5) gave 25% extra whiteness for 3.2c extra cost of soap. Gas cost less than half to accomplish what the soap did.

When you sell them extra hot water *you* get a *load*. When they substitute extra soap for hot water, *soap* companies get the *load*.

Part Hot Water Plays

A recent survey made by a large Eastern electric company on the users of automatic laundry machines in their territory, shows how much a part hot water plays in the success of the automatic laundry machine. This large electric company has 5232 automatic washers on their lines, 88% of them in use for at least three years. Twenty-two different water companies serve different sections of their territory and each has a different water analysis. One water company has an average hardness of 304 parts per million, which is extremely hard. Another has water that contains as little as 45 parts per million, which is less than three grains of hardness.

Of these laundry machine users 45.8% had instantaneous gas water heaters, 35.3% had automatic gas storage water heaters and 18.9% had side-arm gas water heaters. To quote from the electric company's report:

"The most significant fact brought out by these averages is that in one-half of the loads, the starting temperature of hot water was below 140°. Compare this with the fact that 62.5° of the dial settings called for a water temperature of 140° or more in the automatic washer."

"In comparing the 'starting' water temperature of these loads with the average of all loads, we discover a significant difference. Definitely lower temperatures existed throughout the unsatisfactory loads."

To correct the trouble the homeowners in 6.3% installed new automatic gas water heaters.

4.2% set up thermostat.
2.2% made repairs and adjustment.
4.0% waited longer between loads.
3.6% washed on different days
2.2% turned up the gas.
3.2% pre-boiled the clothes.

"Opinions of Housewives Concerning Very Hot Water Supply."

In homes where very hot water was found (over 150°), the housewife was questioned.

Automatic Laundry Machine Facts

1. Cycle can be from 21 minutes to 47 minutes (Exhibit 5).
2. Cycle uses 15 gal. of hot water.
3. Three loads can be washed in 1 hr. 6 min., using 45 gal. of 160° F. water.
4. Temperature settings are as follows:
   a. Cool—60-85° F.
   b. Colors—105-115° F.
   c. Silks—115-125° F.
   d. Cotton—135,145° F.
   e. Hot—155-165° F.
5. Seven and nine pounds of clothes per load (average family 21 lbs. per week).
6. Temperature drop in machine:
   15° F. on dry load.
   30° F. on pre-soaked loads.
   12° drop in conventional washer (110).
   31° drop in conventional washer (185).
7. Cold water slugs due to piping, (Purdue) 25% heat loss.
   37 ft. of ¾ in. pipe requires 7¾ qts. of cold water drained off before hot water is available (Copper & Brass Research).

"In 24% of the homes covered, temperatures over 150° were found. (3% had temperatures 170° and up)."

"In over 80% of these cases, housewives were not perturbed, nor were they aware of any particular difficulty experienced by other members of the family with the hot water. About 12% recalled that they had to be careful when they first used the heater."

"The remaining 8% included a few who wanted the water temperature definitely reduced because they, or

Pamphlets on Water Heater Installation Problems

• "Is It Costing You Too Much to Heat Water?"—This pamphlet published by Revere Copper and Brass, Inc., 230 Park Avenue, New York, describes means of saving money on fuel bills through proper installation of hot water heaters, with particular reference to the size of piping.

• "Micromet for Scale Prevention Corrosion Control."—This booklet by Calgon, Inc., Hagan Bldg., Pittsburgh, describes the use of micromet for the prevention of scale and control of corrosion in household water systems, air-conditioning units, dish, can and bottle washers.

•"Sterilization in the Power Laundry."—Bulletin No. 4 by Ellen H. Richards Institute, Pennsylvania State College, State College, Pa. This is a report on an investigation of the sterilizing effect of various stages and combinations of stages of the power laundry procedure: on a run-of-mine of bacterial organisms in body and household fabrics sent to power laundries for washing, and on three common pathogenic organisms.

• "Scale Formation in Water Heaters and Methods of Prevention."—By J. M. Krappe, Associate in Gas Engineering, Research series No. 74, Purdue University, Lafayette, Indiana. This bulletin is a summary of results of accelerated scale formation tests performed on gas-fired water heaters, and of field experiences with hard-water scale formation and suggested design for feeders to supply scale inhibiting material. There is particular emphasis on the effect of temperature on scale formation and the effect of small passages or tubing, nature of the surface, and water velocities.

• "Home Laundry Investigations."—By P. B. Potter, Virginia Polytechnic Institute, Virginia Agricultural Experiment Station, Blacksburg, Va. Since the original development of the washing machine, owners of this appliance have been inclined to feel that it eliminates all problems in washing clothes, and they merely want to know which machine is best when making purchases. This bulletin covers extensive tests, involving hundreds of washings, which have shown that a goodly supply of hot, soft water, proper use of a good soap, the time period of washing, correct loading of the machine, and other items may be as important, or more important than the machine itself.

other members of the family, did not like it. However, in this group, it seemed mainly a matter of comfort rather than fear."

Lapse of Time Between Loads

"The hot water supply is affected by repeated and speedy succession of washes. The more quickly one load follows another, the higher must be the recovery rate of the water heating equipment."

"Details for the time between the first and second loads, are as follows: 40.3% of the second load was started in 15 minutes, or less, after the first load."

"In half the loads reported in this study, the recovery rate appears to be inadequate. In fact, the low hot water temperatures that prevail by the end of the wash period in half of these loads (125° and down), shows that the hot water supply is not generally hot enough *to meet the known requirements of the automatic machine.*"

"Paradoxically as it may seem, this survey indicates that ordinary water heating equipment will serve, if the customer is willing to sacrifice speed and convenience and wait a sufficient length of time to obtain high water temperatures."

General Recommendations

1. "Salesmen who sell water heaters can render a better service to customers if they recommend new heaters of sufficient capacity to take care of the demands of automatic washers, as has been indicated in this study."

2. "Architects' and Builders' codes should specify large enough water heater capacity to take care of the hot water demands of automatic washing machines. Specifications based upon average demands are important for proper utilization of automatic washing machines."

Emphasis has been placed on the laundry machine, but the automatic electric dishwasher has a similar story. Many pre-fabricated builders will make the automatic laundry machine and automatic dishwasher a standard part of *their* homes.

In World War I, faulty dishwashing caused widespread outbreaks of disease. This war the military profited by that experience and, as a result, no outbreaks were reported where there was adequate hot water of the correct temperature,—to wash dishes according to army regulations. The army had to clean up restaurants adjacent to army camps, in order to prevent civilians from infecting the camp. The automatic dishwasher is one appliance that falls flat on its face on performance when the water temperature goes down.

The gas industry can see all these opportunities. It has all the facts. Now how can the industry keep those faucets open a lot more minutes per day?

Pre-Stressed Concrete Tanks for Underground Gas-Oil Storage

FOR the past few months, work has been progressing on something new in oil storage tanks at South Station of Peoples Gas Light and Coke Co., Chicago. Instead of the customary metal tanks above ground, these two cylindrical tanks will be made of concrete, by a new "pre-stressed" method, and will be located underground.

The two tanks will have a capacity of 500,000 gals. each, and will be used for storing oil, an important ingredient in the manufacture of water gas, principally to enrich the blue gas and bring it up to the desired Btu. content.

The company's drafting department designed the tanks, taking into consideration the special requirements for the kind and volume of liquid being stored.

The "pre-stressed" feature appears in the circular concrete walls of the tanks. Instead of casting the cement in one solid form, the walls of the structures are made up of several units which rest on the reinforced floor slabs. The wall sections rest on grooves which are sealed off by a special kind of mortar. The walls are held in place by means of horizontal rods which can be tightened as desired. The whole arrangement is somewhat similar to the staves in a barrel which are held in place by the hoops.

The walls of the tank in the background are completed and in the foreground the form is being set for the second tank.

The "stress-bands" which completely encircle the sections of wall are more numerous at the bottom than at the top because of hydrostatic pressure. All concrete on the job will have a minimum compressive cylinder strength of 3000 psi. Compression tests are being made as the work progresses.

The new type underground storage tanks not only provide for safer, and more economical storage of gas oils, but they enable the company to avoid using certain scarce metals. The concrete is more suitable for underground use, and the pre-stressed feature gives the company a degree of permanence and dependability heretofore unobtainable for large volume storage in a concrete structure.

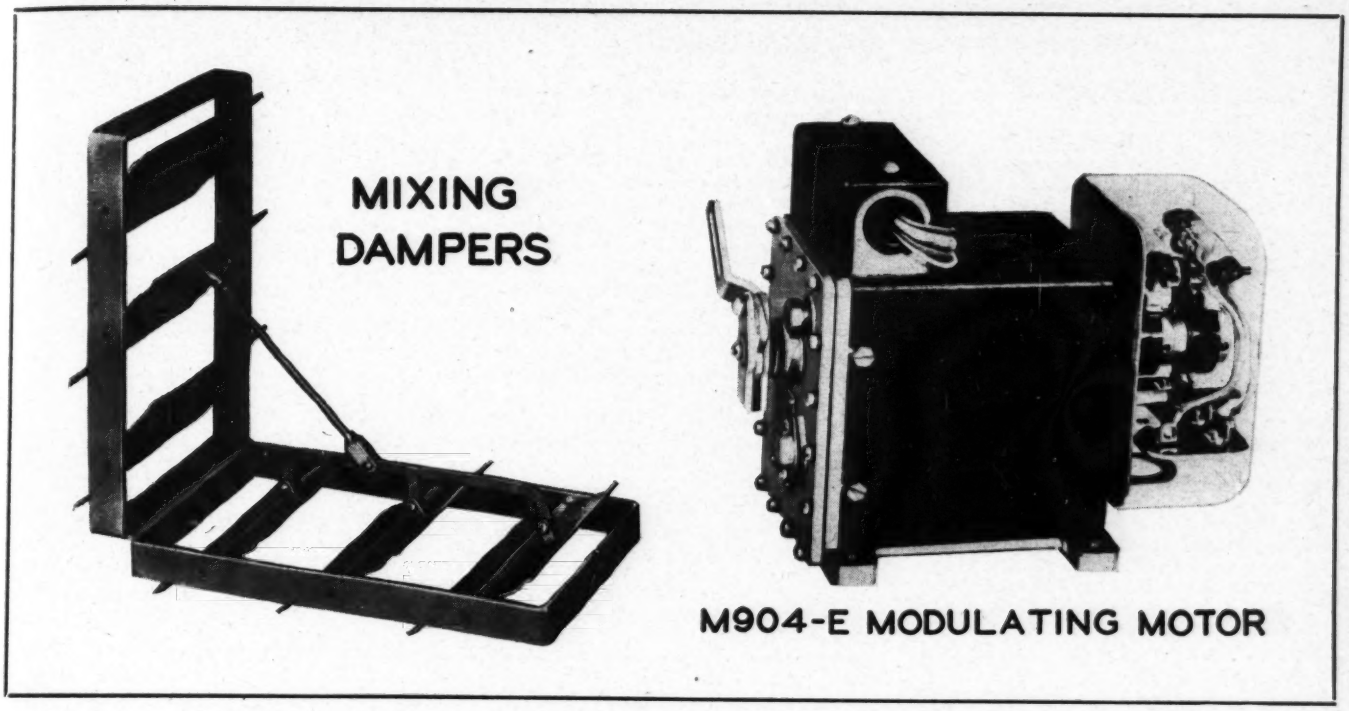


Fig. 1A—Component units, Moduflow by-pass method for warm air.

The Moduflow Control System for Home Heating and Air Conditioning

THE PURPOSE of this study is to present the principles of the Moduflow system of control developed by Minneapolis-Honeywell Regulator Co. Reduced to the parts from which it was coined, Moduflow stands for "modulated flow". Therefore, Moduflow means . . . modulated control to provide continuous gentle flow of heat (air, steam, water). Moduflow provides a constant temperature by maintaining a continuous balance between heat delivery and heat loss. The success of the system is its ability to modulate the temperature of a continuous flow of heat rather than to introduce the heat intermittently at a constant volume and a predetermined temperature. This means there will be an even, continuous flow of just the right amount of heat, to replace the heat loss from the home which occurs every second of the day.

The Moduflow system of control is not an untried experiment. The method of heat modulation and continuous flow, has been applied over a period of years to large structures, such as public and commercial buildings, schools and industrial plants. The engineers responsible for this development have now adapted it for the home, so that it will be available in the postwar period to every home owner at moderate cost.

In thinking of the Moduflow system as applied to the home, it should be pointed out that the system divides itself into two classifications—one a simple application for new and existing homes which require very few changes from conventional systems—the other for new homes or homes being remodeled where provision can be made during construction or alterations for certain additional features and refinements. This study has been prepared for exclusive presentation in Gas by the editors in cooperation with the engineers and Public Relations department of Minneapolis-Honeywell Regulator Co.

TO mechanically-minded Americans, progress in the heating industry from the pot-bellied stove to today's year-round air conditioning system is not looked upon in wonder . . . the nation has come to accept such progress as only natural. Thus, the heating industry has progressed and held its own with other fields so that today the vact majority of Americans live in a comfort unrivalled in the most lavish dwellings of the Continent or Asia.

While public demand played an inspirational part in this development, much of the heating industry's success should be attributed to the diligent efforts of the many individuals who promoted better heating in spite of considerable pessimism on the part of a few. Nor must credit be denied those men within the industry whose talents turned to controls, for in their hands rests one of the most important phases of heating.

As in many of the other mechanical fields, the heating industry first specialized on safety, economy, convenience, and appearance. It was assumed that by accomplishing these objectives, the much discussed health and comfort factors would be automatically achieved. In actuality, however, convenience, economy and appearance frequently were stressed to the detriment of health and comfort.

The desire for convenience has brought about the demand for automatic firing and, in turn, automatic firing has brought on the intermittent control systems of the day. These control systems are composed of three major parts:

1. The primary heating control which controls the burner.
2. The room thermostat which tells the primary control when heat is required.
3. The safety devices which protect the equipment against overheating

MODUFLOW CONTROL SYSTEM

PERTINENT FACTS ON MODUFLOW

QUESTION: What is Moduflow?

ANSWER: Moduflow is a system of control to provide a constant temperature by maintaining a continuous balance between heat delivery and heat loss, as distinguished from the conventional control system whereby heat is delivered in an intermittent or on-off manner. Since it is a system of control, it may consist of a number of individual components, each performing a separate function as a part of the whole system. To produce Moduflow results, any assembly of individual components must perform four essential functions, and the merit of the system depends on its ability to perform all of these functions rapidly and accurately. (1) It must measure the temperature of the room accurately and rapidly. (2) It must measure and overcome the lag of the heating system. (3) It must measure and compensate for the inertia (stored heat) of the heating system. (4) It must regulate the heat generated at the source to just balance the loss.

QUESTION: Is Moduflow more difficult to install than the conventional heating control system?

ANSWER: On new installations the various Moduflow methods require very little additional time to install over the conventional control system. The reset system would require roughly one to two hours additional time with an electrician or the by-pass system would require approximately one hour additional time for an electrician and two hours time for a plumber or sheet metal man. The time required on old installations varies from a few hours up to a full day to make a complete Moduflow installation depending on the individual method used and the heating application.

QUESTION: Is it more difficult to maintain than the conventional heating control system?

ANSWER: There should be very little difference in the maintenance of the Moduflow control system over the conventional control system. While it is recognized that the Moduflow system should be checked once a year, it should in reality be just as important to check conventional systems, although the conventional systems are often permitted to go several years before checking; in fact, until a failure occurs.

QUESTION: Is a Moduflow system more expensive than the conventional heating control system?

ANSWER: In relation to a new installation where the conventional controls are not replaced by Moduflow controls, the additional cost at present should not exceed $100 to $125 more than the cheapest conventional control system. If a more expensive conventional system is incorporated, additional costs for Moduflow would not be nearly so great.

QUESTION: Can Moduflow be applied to standard warm air heating furnaces?

ANSWER: One of the reasons that several Moduflow methods are available is so that Moduflow can be adapted to the heating system rather than attempting to adapt the heating system to Moduflow. Moduflow can be installed on practically any forced warm air installation, many gravity installations, any forced hot water and many gravity hot water installations and on two pipe steam installations. New methods are now being developed that will enable the adaption of Moduflow to practically any type of heating plant known. In general Moduflow does not require a special burner or change in the furnace jacket.

and, in the case of gas-fired equipment, prevent opening of the gas valve when the pilot is out.

All automatic heating equipment is controlled by a system composed of similar units of these three classifications.

The By-Pass Method

With the conventional control system the burner is started when the thermostat indicates a need for heat and is stopped when the same thermostat is satisfied. This produces intermittent on-off heat supply. With the Moduflow method the burner is operated to maintain within a very few degrees variation the average register or radiator temperature necessary to produce a continuous flow of heat to just offset heat losses. In this case the thermostat measures the rate of heat loss and raises or lowers the register or radiator temperatures to meet the current need.

One method of accomplishing Moduflow is the by-pass method, using a mixing valve or mixing damper arrangement whereby the temperature of the heating medium is constantly being modulated to meet the heat loss. With forced hot water or forced warm air continuous circulator or blower action is necessary. In reality this is not a new principle but merely a new application. Many commercial buildings, churches, schools and a few large homes have employed the principles of such a system for more than a decade. Only during this past season has such control equipment been installed in the average home.

A variation of this system employs two standard limiting devices in place of the compensating limiter. In such case the position of the by-pass valve or damper determines the limit control. One is set low for mild weather and one set high for cold weather.

Fig. 1A shows a mixing damper with motor for warm air application, Fig. 1B a mixing valve for hot water control, and Figs. 2 and 3 show line drawings of typical systems.

For the warm air application typified in Fig. 2 the Moduflow room thermostat controls the Moduflow motor to position the mixing damper so that the air passing through the furnace is mixed with that which is passed through the by-pass. This automatically supplies air at the proper temperature to offset the heat loss of the space. As the room temperature decreases, the thermostat positions the by-pass damper to force more air over the heating surface. This results in higher air temperature to offset the increased heat loss. As the heat requirement is reduced and the room temperature starts to rise, the thermostat re-positions the by-pass damper to allow less air to pass over the heating surface. This lowers the air temperature to equalize heat input with heat loss. Regardless of the damper position the quantity of air supplied to the heated space is constant because the volume of air passing over the heating surface increases as the volume of air passing through the by-pass decreases and vice versa.

At all times a minimum of 10% of the total air volume should pass over the heating surface. This assures more uniform bonnet air temperatures and at the same time acts as a protection to the heating unit. An auxiliary switch located on the Moduflow damper motor shuts off the blower when the motor positions the by-pass damper for maximum by-passing of air. This switch also cuts off the burner so the burner cannot turn on until the room thermostat calls for heat. The stopping of both the blower and burner only occurs when the room thermostat is entirely satisfied.

The burner is controlled by an Airstat with the heat element located in the furnace bonnet. The Airstat setting should not be more than 10° above the bonnet temperature settings required to produce highest register air temperatures necessary during coldest weather. A second Airstat may be desired to act as a high limit safety device. The burner will most likely be the on-off type operating intermittently to maintain the average bonnet temperatrue called for by the Airstat. The operating frequency of such equipment may be decreased, if desirable, by increasing heat storage capacity of the heating element.

For a hot water application, Fig. 3 shows a Moduflow three-way mixing valve installed in the supply main. One inlet is connected to the hot water supply from the boiler. The other inlet is connected to a by-pass

line taken from the return between the circulator and the boiler. The other inlet is connected to a by-pass line taken from the return between the circulator and the boiler. The outlet is connected to the main supplying the radiant panels. A positive Btu rated pressure relief valve must be provided on the boiler side of the three-way valve. Balancing cocks are desirable in branch returns to permit manual adjustment.

A Moduflow room thermostat operates the Moduflow motorized three-way mixing valve to proportion the quantity of water passing through the boiler with that passing through the by-pass. A decrease in room temperature positions the valve to force more water through the boiler, thereby increasing the water temperature to the panels. On a rise in temperature, the amount of water passing through the boiler is decreased and that through the by-pass increased to reduce the water temperature. A constant volume of water is circulated at all times, its temperature varying as more or less

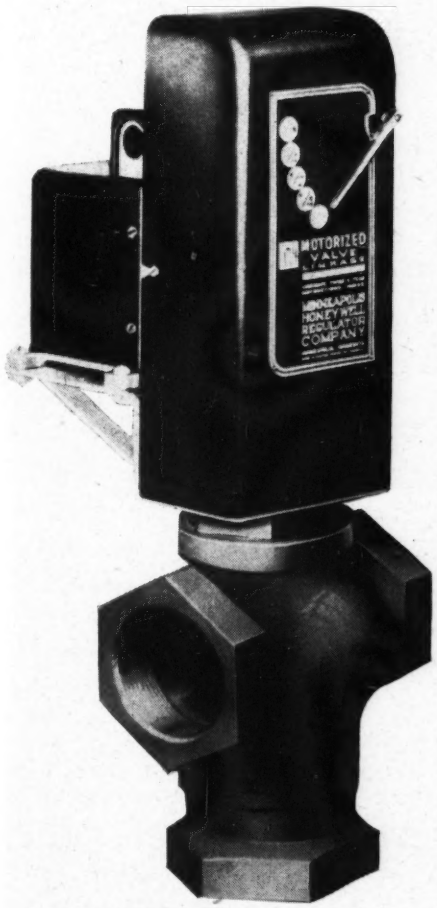


Fig. 1B—Component unit, Moduflow by-pass method for hot water.

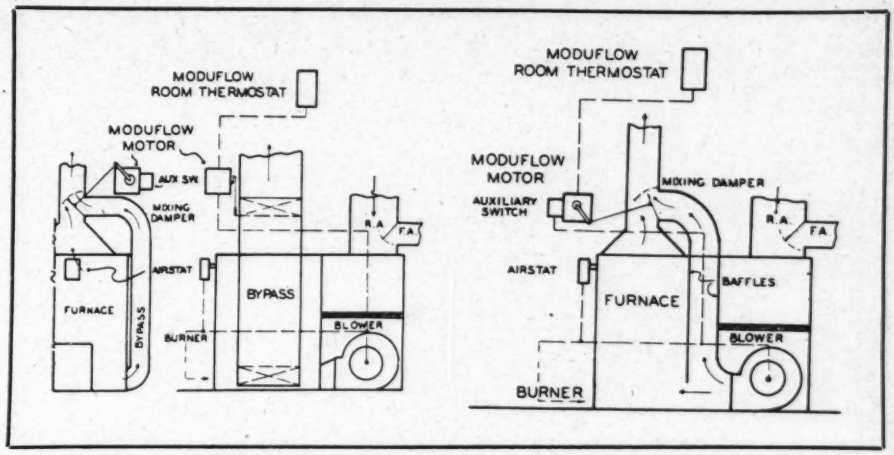


Fig. 2—Moduflow by-pass control for warm air.

is allowed to pass through the boiler. The resultant water temperature to the panels is just sufficient to offset the heat loss of the building. When no heating is required, the valve will be positioned so all water is passing through the by-pass. At this time an auxiliary switch on the Moduflow motor valve cuts the circuit to the circulator and burner.

The burner is controlled by an Aquastat set to maintain as low a boiler water temperature as is practicable.

The Reset Method

A second method of the Moduflow control principle is known as the reset method. One way in which control of forced air heating equipment may be accomplished is in Fig. 4. This method makes use of a Moduflow room thermostat, a reversible or floating motor, and a remote bulb temperature controller. A timer or interrupter is installed in connection with the motor to increase the time required for the motor to effect a complete cycle. This is accomplished by cutting the power circuit to the motor a large portion of each minute, and is necessary to permit a sufficient period of time to overcome the lag between the burner operation and its effect within the heated space.

The remote bulb of the temperature controller should be located in warm air trunk line near the furnace, but it must be shielded so the direct radiant rays from the heating surface will not affect the bulb. Only true duct air temperature should be "felt" by the controller. As the heat demand increases, the Moduflow thermostat operates the motor which raises (resets) the control setting of the temperature controller, calling for more rapid heat delivery. When the room temperature rises toward the thermostat setting, the motor reverses and resets the temperature controller to a lower setting, thereby decreasing the rate of heat delivery. When equilibrium between heat input and heat loss is reached, the burner operates to maintain duct air temperatures between the differential range of the controller. In this manner, the flow of heat into the heated space is continuous and the register air temperature is varied to meet the actual heat replacement demand.

In mild weather when the outside temperatures approach the thermostat settings, the thermostat will soon be satisfied, the controller will reach its minimum setting, and the end switch on the motor will shut off the firing device and blower. A high limit Airstat is installed to act as a safety device.

Night shutdown is provided on all reset systems. The Moduflow thermostat and a time clock in the panel provides this added feature. When the time switch cuts over to night control temperatures, either conventional on-off operation or Moduflow operation, at the night thermostat

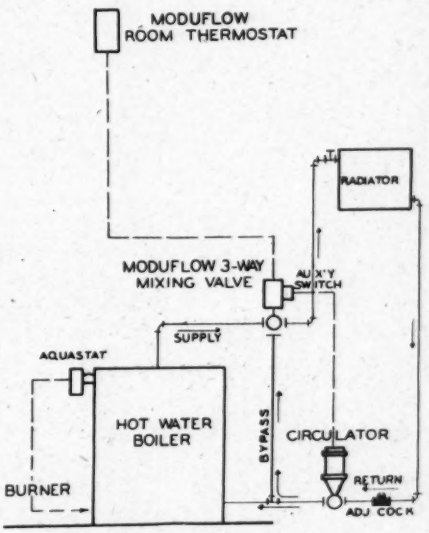


Fig. 3—Moduflow by-pass control for hot water.

MODUFLOW CONTROL SYSTEM

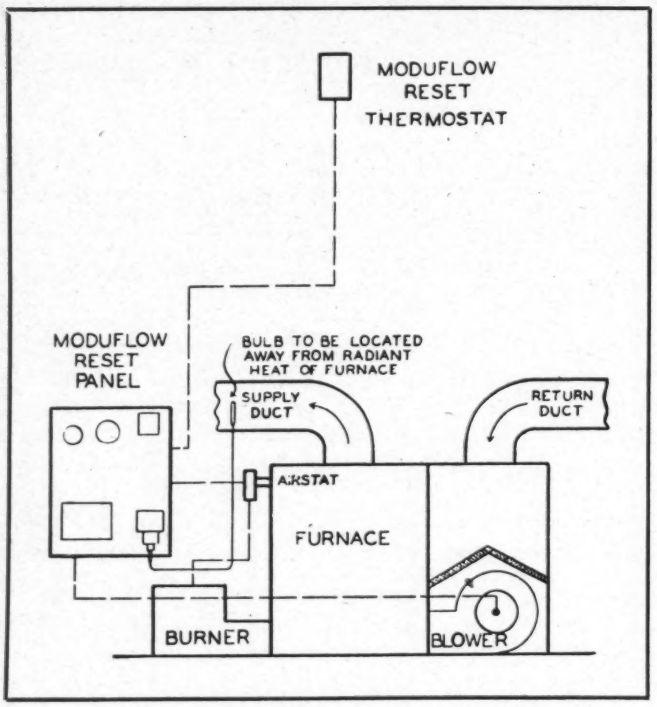


Fig. 4—Moduflow reset control for warm air.

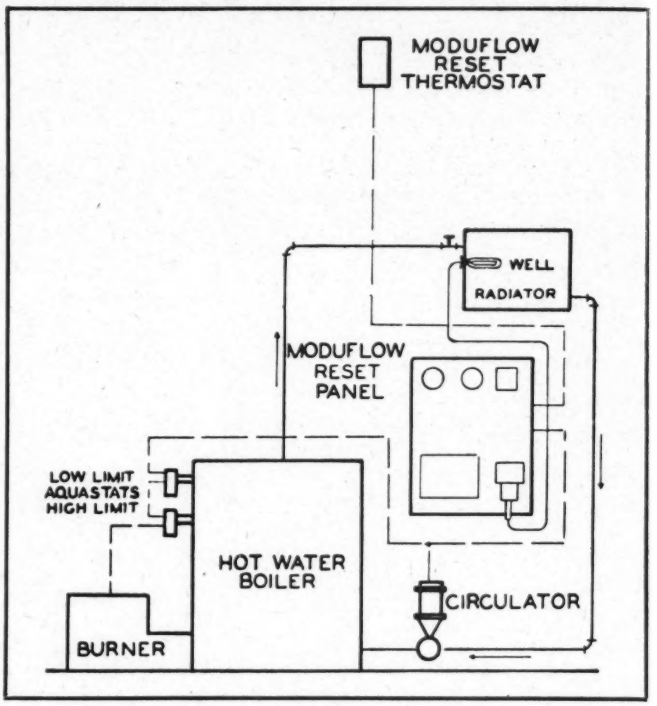


Fig. 5—Moduflow reset control for hot water.

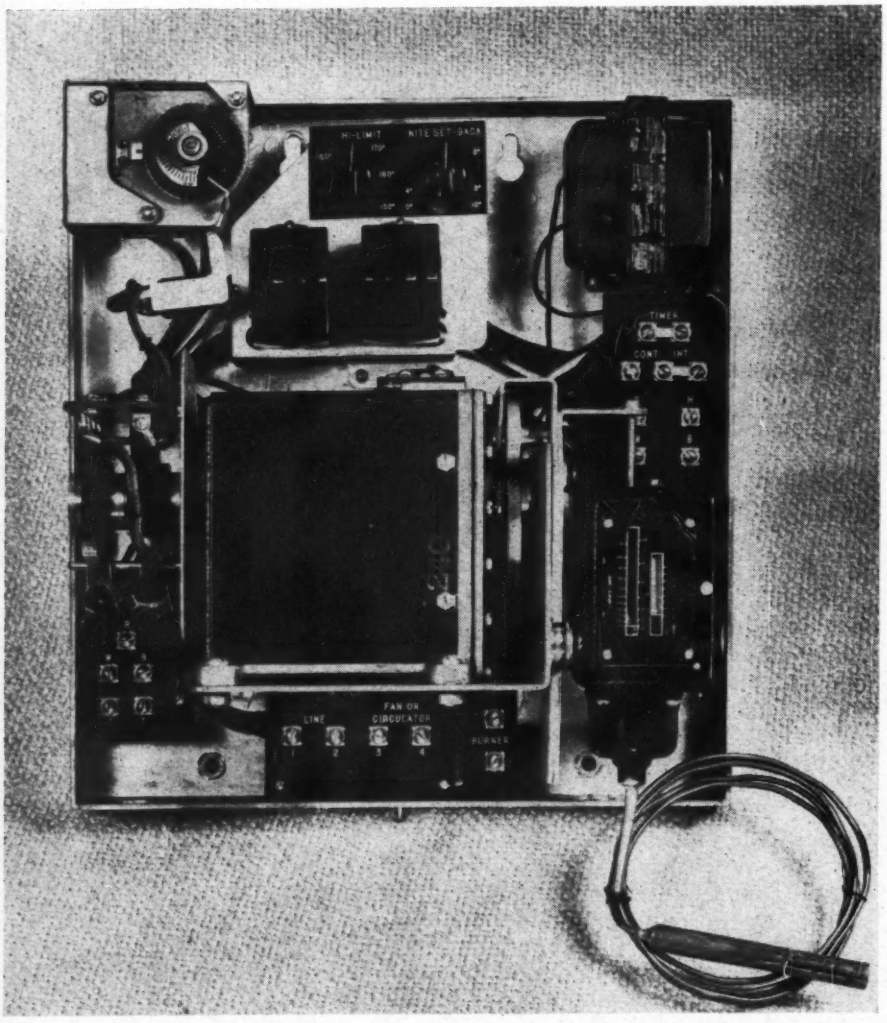


Fig. 6—Interior view of Moduflow reset control panel.

setting may replace the day Moduflow operation.

The Moduflow reset method of controlling forced hot water heating systems with indirect water heater for heating domestic hot water varies somewhat with the reset method used for similar systems without the indirect water heaters. The reset panel used is identical in each case, but their application is slightly different. In both cases the bulb of the temperature controller must be located in a radiator rather than in the boiler.

With An Indirect Water Heater

The sequence of operation of the system with the indirect water heaters is as follows (see Fig. 5): The thermostat signals to the reset panel that more or less heat is required. The motor which is controlled by the thermostat then resets the temperature controller higher or lower as the demand requires. The switch of the controller not only starts and stops the burner within the limit of its setting but also starts and stops the circulator at the same time. Since the bulb of the temperature controller is located in one of the radiators and since the temperature controller is set with only a two degree differential, intermittent circulator operation will not interrupt the continuous flow of heat from the radiators.

In order to maintain sufficient boiler water temperatures in mild weather for the indirect water heater, a low limit Aquastat is installed to

operate the burner independent of the reset panel. The Aquastat must be installed in such a manner that it will not operate the circulator. Systems without an indirect water heater do not require the low limit Aquastat. A high limit Aquastat must be installed to shut off the burner at the maximum boiler water temperature necessary to furnish sufficient heat in coldest weather. The end switch of the reset motor shuts off the circulator when the temperature controller is at the minimum.

Without An Indirect Water Heater

The sequence of the operation of systems without indirect water heaters for domestic hot water is materially the same as systems with indirect water heaters. The main difference is the omission of the low limit control. The burner is controlled directly by the temperature controller as is the circulator. The end switch of the reset motor shuts off both burner and circulator when the temperature controller is at its minimum setting, and no heating is required.

From the photograph shown in Fig. 6 the control appears to be complicated; actually it is not. The entire panel is housed in a compact cover.

All Moduflow methods require the modulating type of thermostat shown in Fig. 7. This, of course, differs widely from the conventional "on-off" thermostat and appears to be one of the reasons why reports indicate enthusiastic public acceptance of this new method of controlling home heating plants.

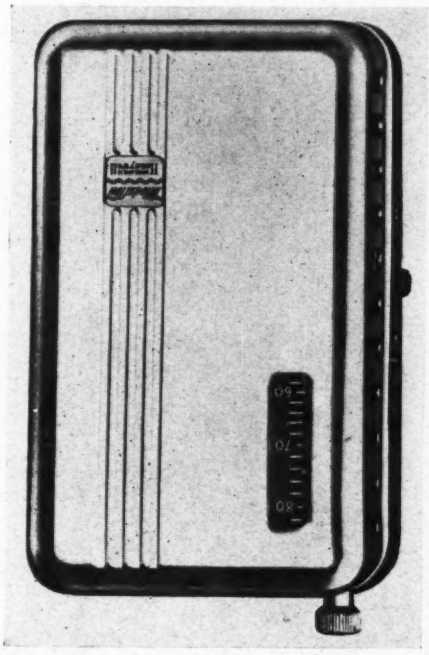


Fig. 7—Modulating type wall thermostat.

A "Help For Home Builders" booth has been set up on the sales floor of Lone Star Gas Co.'s Dallas division of distribution. Prospective home builders and remodelers are given a free copy of the company's Gremlin booklet which shows proper and improper methods of installing gas appliances. Harry Jordan, new business solicitor, is show above explaining the Gremlin booklet to a customer.

Gremlin Booklet Helps Dallas Home Builders

LONE Star Gas Co. Gremlin booklet is attracting customers to its "Help For Home Builders" booth set up on the sales floor of the Dallas (Texas) Division of Distribution. The booth was opened October 15, simultaneously with removal of building restrictions by the government.

Featuring the idea of the impish little red "House Gremlin" which is sure "to get you if you don't plan right," purpose of the booth is to aid builders in planning new homes or remodeling present dwellings. Assistance is offered in effective and efficient arrangement and selection of new gas equipment.

The service includes a free copy of the 32-page Gremlin booklet, fully illustrated and in color, showing the proper installation and use of the new gas appliances which are now coming off production lines. The booklet shows how to plan and install flues for venting equipment to eliminate wall sweating and stuffy air; where to locate gas outlets and equipment; gives detailed explanation of proper heating and the various methods and how each is installed; how to plan a convenient kitchen—all done in a most unique and easy-to-understand manner. Distribution of the booklet is limited to Lone Star Gas Co. customers who are actually planning a new home or remodeling their present one.

The booth was announced to the public with newspaper ads featuring the Gremlin. The advertisements have brought many prospective builders to the "Help for Home Makers" booth and have resulted in many requests for the Gremlin booklet, according to J. M. Lynn, Jr., new business manager for Lone Star Gas Co. Dallas Division of Distribution.

P. G. and E. Ads Ranked Second in Utility Contest

In the annual nation-wide competition conducted by "Public Utility Ad-Views" Pacific Gas and Electric Co., San Francisco, has been ranked second among the utilities of the country for excellence in advertising during 1945. P. G. and E. won first prize in 1944. More than 125 utility companies participate in the competition. R. R. Gross is advertising manager for P. G. and E.

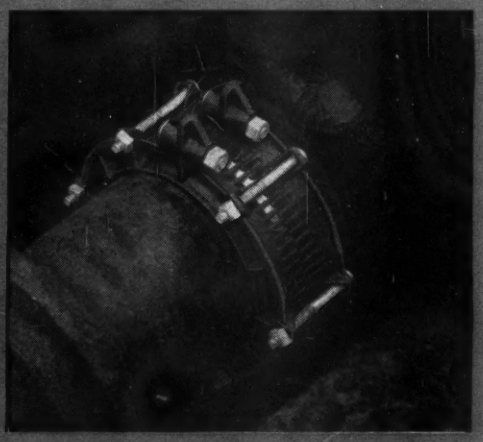
FOR Unbroken

FOR UNINTERRUPTED distribution, repair all leaks and breaks in mains with SKINNER-SEAL pipe repairs.

We are making gratifying progress in our reconversion to peacetime production. Many sizes of certain clamps shown in this advertisement are back in stock — others are coming as conditions improve. However, best results are still obtained by letting us know your requirements as far in advance as possible.

SKINNER-SEAL EMERGENCY PIPE CLAMPS. For stopping leaks in steel or cast iron pipe lines, instantly, permanently. Sizes 1/2" to 12". Pages 10-11. Catalog No. 41.

SKINNER-SEAL PIPE LINE CLAMPS. For repairing long splits or very bad corrosion in pipe lines. Tremendously strong—for highest pressures. Pages 12-13. Catalog No. 41.



SKINNER-SEAL SPLIT COUPLING CLAMPS. For instantly repairing clean breaks in cast iron mains. Sizes 2" to 16". Pages 8-9, Catalog No. 41.

WRITE OR WIRE — M. B. SKINNER

Installation of Mechanical Joint CAST IRON PIPE

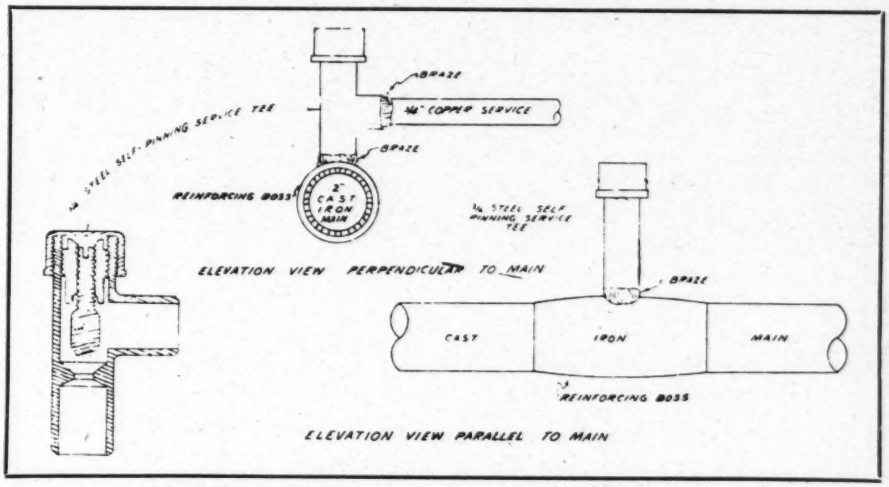
By RALPH E. HAUN

Engineer, Southern California Gas Company, Los Angeles.

THE use of cast iron pipe for gas mains is not new, but cast iron pipe with a working pressure of 250 psi, and which can be coupled and installed for one-third the labor cost of substitute material, should be of interest to gas distribution companies. These installation economies are principally the result of the mechanical joint of the cast iron pipe. This joint consists of a special gland with follower ring and rubber gasket.

Recent experience with the installation of several miles of 2-in. cast iron pipe by the Southern California Gas Co. at Los Angeles has demonstrated that little skill or effort is required to install this pipe when coupled in the field with the mechanical joint. This 2-in. cast iron pipe was prefabricated at the factory into 18-ft. and 24-ft. lengths, and it was found that three unskilled workmen in the field can swab and make up the joints at a rate of about 1000 ft. per hour.

An indirect saving results in handling cast iron pipe since there is no coating which needs to be protected from damage in storing, trucking, handling, unloading, or which can be damaged by building construction workmen while the pipe is strung in the field. Furthermore, in lowering or backfilling, the usual precautions in protecting coated pipe are not necessary.



Method of connecting copper services to cast iron mains.

In swabbing the pipe preparatory to making up the joints, it is found that cast iron pipe is more readily cleaned because there is no internal corrosion.

Two-inch pipe with mechanical joints permits sufficient joint flexibility so that the pipe may be installed without fittings on curves of radius of not less than 200 ft.

For making service connections, "bosses" are provided on 2-in. pipe. The use of cast iron mechanical joint 2-in. fittings provided by the manufacturer is being considered; however, practice on this job was to braze tees of substitute material to these "bosses" from which tees service lines were extended. The main was then drilled out in accordance with standard practice. After the original installation, if lateral main extensions are required, a pressure extension fitting may be brazed to the side of the main at a "boss," or a self-pinning tee placed on the top of a "boss" connnection. The only limitation in these lateral extensions is that the diameter of the tap hole on a 2-in. cast iron main can be no greater than 1¼-in. diameter. Two-in. cast iron pipe can be easily cut with a three-wheel pipe "cutter."

Close view of assembly operation on 2-in. mechanical joint cast iron pipe for gas service, showing gasket follower-ring and gland assembled on spigot which is ready to insert into threaded bell.

In testing the pipe, precaution should be observed in analyzing pressure charts. Fluctuation of pressure with temperature changes has been found to be quite pronounced due to the exposure of the bare cast iron pipe which reacts faster to the temperature changes than does coated pipe.

Whenever substitute materials are brazed to cast iron pipe, the cast iron pipe should be coated past the weld an additional 18 in., with the usual field wrap protection to prevent galvanic action due to the dissimilar metals.

When the longer life expectancy is considered, together with installation economies plus minimum maintenance expenses and the permissible use of unskilled installation labor, cast iron pipe appears particularly attractive, especially for gas distribution mains.

Bureau of Mines Gas Research Program

Presented to Interstate Oil Compact Commission December Meeting

By O. D. HALL
Mid-Continent Editor

"THE war has forced a development of processes whereby we are just beginning to recognize that our natural gases and their products may, in the future, outweigh on an annual basis many times the value of produced oil," said a statement of the U. S. Bureau of Mines distributed at the winter meeting of the Interstate Oil Compact Commission at Wichita, Kan., Dec. 15-18.

The statement presented in detail a proposed program for natural gas research by the bureau covering 26 points. (See Table 1.)

The bureau at present is prevented from carrying out the proposed expanded research program by limited funds and personnel. During the war it was diverted from continuing with some of these studies because of the necessity for greater attention to petroleum production.

The natural gas industry in California was declared to be "big business in that state" by Roy M. Bauer, gas supply supervisor, Southern California Gas Co. and Southern Counties Gas Co., Los Angeles.

Developing from an investment of a few thousand dollars prior to 1908, to more than $360 million in 1944, the industry had more than 25,500 miles of pipelines at the beginning of 1945. It has acquired 2,100,000 customers within the past 30 years. Natural gas was third in value in California's mineral production in 1944, being exceeded in value only by petroleum and gold, Bauer pointed out.

Appalachian Area

Prior to 1944 the five Appalachian states, New York, Pennsylvania, Ohio, Kentucky and West Virginia, produced all of the natural gas consumed within their borders, H. J. Wagner, chief of the gas section, engineering department, public service commission of West Virginia, pointed out. They also exported gas to the District of Columbia, Maryland, Virginia and Canada.

There are approximately 45,000 gas wells in the Appalachian area and in 1943 these wells produced 520 MMcf. of gas. "By using these wells 365 days a year and by reducing line pressures to the lowest point possible with the equipment available and obtainable, sometimes actually having a vacuum in the field lines at the wellhead, producers were generally able to meet the increasing demand during the early years of war," Wagner reported. "It was quite apparent, however, particularly because of the declining productivity of the Oriskany sand in the southern part of West Virginia, that it would be soon impossible to meet the peak demand with the facilities then available or that could be developed, and that gas from outside the area would have to be brought in, if domestic and essential industrial requirements were to be met."

During the summer months of 1943 off-peak gas obtained from the Panhandle Eastern line enabled local companies to put more gas into storage pools, and on Nov. 1, 1944 the Tennessee Gas and Transmission Co.'s line was completed and started delivering gas into the Appalachian area, the paper stated.

The demand for gas in the area during the present winter will be appreciably less than last year, Wagner estimated. New gas wells drilled, particularly in West Virginia, will provide a higher potential deliverability which will partially offset the decline in gas available from old wells. Due to the increased volume of gas in storage pools, the deliverability potential of these pools was higher on Nov. 1, 1945 than at the same time last year. One hundred and ten million cu. ft. of additional gas will be available daily from the Panhandle and Tennessee pipelines late this year, the paper reported.

Robert B. Hipple, publisher of the *Capital Journal*, Pierre, S. D., submitted a paper reporting on natural gas production in the Pierre area. Natural gas has been produced continuously in the city of Pierre since 1892 and gas has been serving the city as a fuel for domestic purposes, dis-

TABLE 1. BUREAU OF MINES RESEARCH PROGRAM FOR NATURAL GAS

Natural Gas Production (Expansion of Studies on)

1. Testing gas wells
2. Operating practices
3. Gas well drilling and completion methods
4. Underground storage
5. Use of tracer gas in reservoirs
6. Methods of estimating gas reserves
7. Field utilization of natural gas
8. Helium resources

Natural Gas Transmission

1. Further study of corrosion, principally to extend the life of the thinner-walled pipelines built during the war period.
2. Derive better methods of calculating pipeline efficiency.
3. Study new developments in compression prime movers and remote control equipment for lower costs and more efficient compression.
4. Find more accurate and less complicated means of applying principles of gas measurement in the field to pipeline operations.
5. Develop the present spot dewpoint apparatus into a continuous recorder for better control of pipeline equipment.
6. Increase transmission efficiency for treating natural gases to remove water, oil vapor, corrosive components and other objectionable matter.

Natural Gas Utilization

1. Studies to develop basic data for conversion of natural gas into chemicals, plastics, drugs and other synthetics.
2. Increase efficiency of carbon black extraction from natural gas.
3. Investigate the possibility of obtaining carbon black from substances other than natural gas.
4. Study properties of materials at low temperatures.
5. Devise a commercial means of fractionating natural gas in order that the components may be used in chemical manufacture so that low Btu gases may be better utilized.

Other Proposals Include Studies on:

1. Phase relations and thermodynamic data.
2. Production, storing and transportation of liquefied gases.
3. Determining liquid hydrocarbon content of natural gases.
4. Determining sulphur content of natural gases.
5. Developing a more economical and practical commercial method of removing hydrogen sulphide from natural gas, thereby utilizing sour natural gases.
6. Establishing an analytical laboratory with full equipment to serve industry in difficult cases of analysis.
7. Developing better laboratory equipment in the field of natural gas.

tributed by a municipally owned utility system.

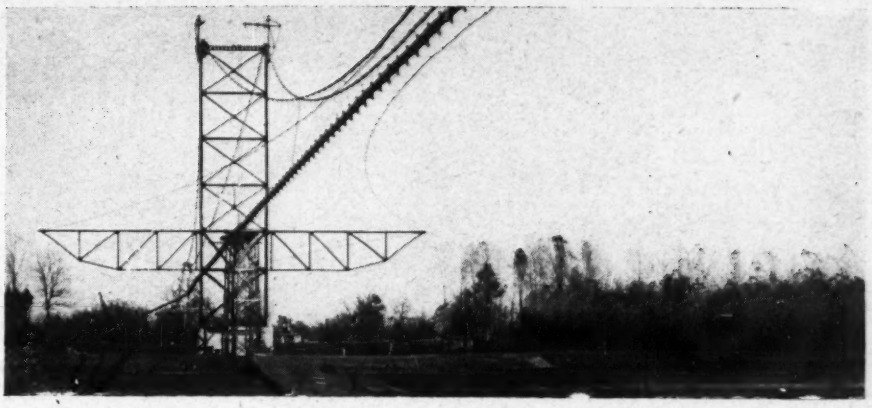
The question of whether the state or federal government should hold titles to the tide lands abutting the seas where oil and gas are found was a principal subject discussed by the Interstate Oil Compact Commission representatives at Wichita. Several speakers contended that the states should control these lands. The only speaker to present the pro-federal control viewpoint was Warner Gardner, solicitor for the Department of the Interior. Sam Jones, former governor of Louisiana, told of recent development in his state which resulted in one of the major petroleum producers drilling three wells offshore in the Gulf of Mexico. "Federal agency operators never could have succeeded in promoting such a project," Jones said.

The Oklahoma oil industry sustained a loss of 3,000,000 bbls. of crude oil through the plugging of small wells in the year 1944, according to a paper presented jointly by E. G. Dahlgren, technical secretary of the commission, and George Pasquella, consulting geologist-engineer of the National Stripper Well Association. In the same year production in stripper fields totaled 58,200,000 bbls., almost half the state's total production. The paper reported that 12.9% of the United States production in 1944 came from stripper wells.

Activities to be Expanded

Consensus opinion of representatives of 17 states attending the meeting was that the future of the oil and natural gas industry lies in a sharp curtailment of federal controls placed on the business and an increase in the regulatory authority assumed by the various states. It was also agreed in discussions that the activities of the Interstate Oil Compact Commission should be enlarged and that the personnel should be expanded, to take care of increased responsibilities.

At the closing session Robert S. Kerr, governor of Oklahoma, was named chairman of the Interstate Oil Compact Commission, succeeding Governor Andrew F. Schoeppel of Kansas who refused a fourth term. Hiram M. Dow, former lieutenant governor of New Mexico, was named first vice chairman, succeeding the late Judge C. Hunter, Texas. Warwick M. Downing, Denver, was renamed second vice chairman and Earl Foster was re-elected secretary. Walker T. Pound, conservation officer of the Oklahoma Corporation Commission, was chosen as chairman of the Research and Co-ordinating committee,



Located at East Point La., where the United Gas Pipe Line Co.'s new Carthage-Sterlington pipe line crosses the Red River, this bridge is believed to be the largest of its kind in the world. The suspension bridge was constructed with a 3200-ft. elevated section and a 1600-ft. clear span. The pipeline, built at a cost of approximately $7,500,000 to meet increased demands for post-war expansion, will afford a new outlet for natural gas from Carthage, Texas, Gas field.

United Gas Pipe Line Company Completes $7,500,000 Carthage Line

TO meet increased demands for natural gas for post-war industrial expansion and to supplement the gas supply in the Monroe area, United Gas Pipe Line Co. this week announced completion of a 142-mile, 24-in. pipeline from the Carthage gas field in East Texas to Sterlington, La., at a cost of approximately $7,500,000.

The line, which is similar in pipe size to the much publicized "Big Inch" pipe line, is now in operation. The whole project, including a gasoline plant at Carthage, Texas, should be completed early in 1946. Approximately 2000 persons were given jobs as a result of this construction project.

The new pipeline, authorized by the Federal Power Commission last July, provides an outlet to major markets for Carthage gas, and will benefit land and royalty owners in the Carthage field and bring hundreds of thousands of dollars annually into the region. The Carthage field, situated as it is in an important producing area, had only limited outlets prior to completion of this pipeline.

Through the new line, United is in position to augment gas supplies in the Monroe area, and to furnish gas to Tennessee Gas and Transmission Co. through a connection at Sterlington, La.

Work is proceeding at Carthage toward the completion of the gathering system and the gasoline and dehydrating plants. There facilities are expected to cost more than $7,000,000 bringing the total cost of the entire completed project to approximately $14,500,000.

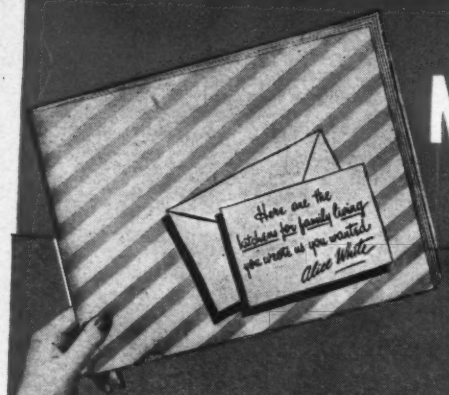
The gathering system when finally completed will include construction of approximately 140 miles of pipelines, including 20-in., 18-in., 16-in., 12-in., 10-in., 8-in., and 6-in. pipe.

The main pipeline construction job began July 31, and passed the halfway mark in September. By way of illustrating the many operations involved, the finished project will represent 282 miles of main and gathering lines. The rights of way had to be cleared, grubbed, graded and ditched, before the lines, which had to be welded and coated, could be laid, and backfilled. Thereafter, clean-up and testing completed the work.

The line crosses six major streams, the Red, Sabine and Ouachita rivers, Loggy Bayou, Bayou Pierre, and Bayou d'Arbonne. Crossings were effected by building multiple underwater lines, except that at the Red River, a suspension bridge was constructed with a 3200 elevated section and a 1600-ft. clear span to support an overhead pipeline crossing at East Point, La., 27 miles below Shreveport. This suspension pipeline bridge is believed to be the largest of its kind in the world, and has called for unusual engineering design and construction skill.

The main line is designed for a capacity of 310 million cu. ft. of gas, with 1000 lbs. of pressure at the Carthage gas plant discharge, and 500 lbs. at Sterlington.

New Full-Color Consumer Book



Here's our secret of planning your kitchens for family living . . .

KITCHENS—unlike relatives—needn't be always the same. You can change your humdrum kitchen to suit your family needs—just as you can transform your living room.

First, decide what uses—besides meal preparation—your kitchen should serve. Perhaps you need a place for dining—or for fixing the baby's formula—or for chatting with your husband. You can have it.

With a pencil and a rule, draw a rough floor plan of your room. Divide it into two areas . . .

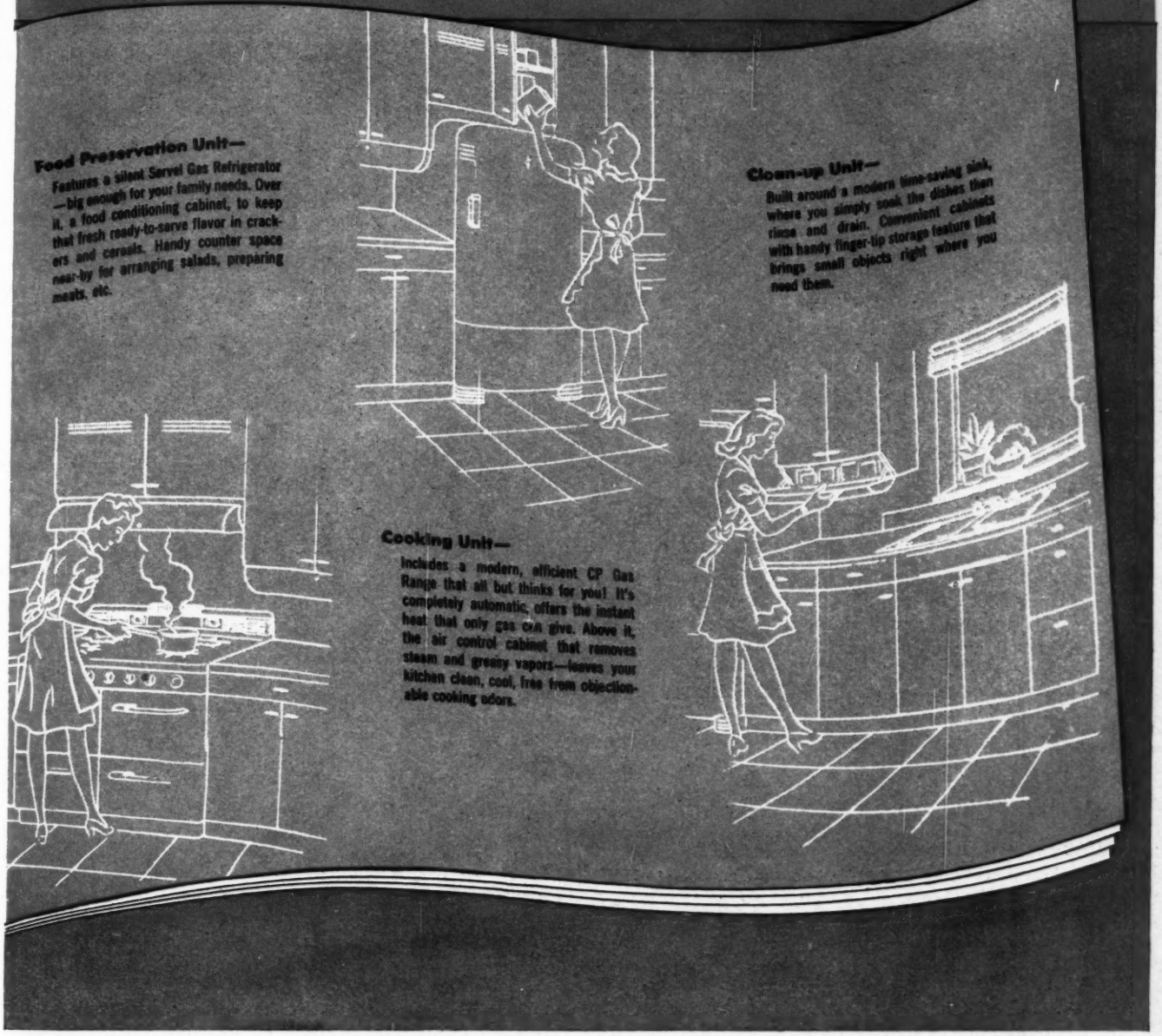
A WORK-SAVING AREA—*Refrigerator, range, sink and cabinets should be arranged as compactly as possible. This saves wearisome cross-walking. Each should have adquate storage and counter space, to avoid needless stooping and stretching.*

A LIVING AREA—*By condensing your working area you free the extra space you need for a dinette, laundry, breakfast bar, or lounge.*

You'll note in this book some unconventional methods of laying out kitchens. They're right for the folks who live there. For instance, the sink may be turned out into the center of the room to condense the work area and allow livable extra space. Large window areas bring outdoor sunshine in. As you glance through this book, take a fresh look at your own kitchen—and see how much more efficient, and more livable, you can make it!

Every woman in your town will want a copy of this exciting, new full-color "Kitchens for Family Living" book, because it deals with specific family problems and their solution in terms of today's smart kitchen planning. It shows how individual kitchens, featuring the C. P. Gas Range and the Servel Gas Refrigerator, can be planned and installed quickly, easily—using Servel-designed cabinets, sinks and accessories. It explains how every kitchen can be made cleaner, cooler, free from objectionable cooking odors.

Promotes New Freedom Gas Kitchens . . .


Food Preservation Unit—
Features a silent Servel Gas Refrigerator—big enough for your family needs. Over it, a food conditioning cabinet, to keep that fresh ready-to-serve flavor in crackers and cereals. Handy counter space near-by for arranging salads, preparing meats, etc.
Cleon-up Unit—
Built around a modern time-saving sink, where you simply soak the dishes then rinse and drain. Convenient cabinets with handy finger-tip storage feature that brings small objects right where you need them.
Cooking Unit—
Includes a modern, efficient CP Gas Range that all but thinks for you! It's completely automatic, offers the instant heat that only gas can give. Above it, the air control cabinet that removes steam and greasy vapors—leaves your kitchen clean, cool, free from objectionable cooking odors.

Homemakers will find its 28 dramatic pages packed with smart new kitchen ideas, with brilliant color schemes and practical floor plans. For this book utilizes the techniques of the most up-to-date decorating magazines to create livable, usable, work-saving kitchens.

"Kitchens for Family Living" is available to Gas Companies at 10¢ per copy. Order your supply now from Servel, Inc. If you have not yet seen this practical, colorful book, send for your free copy today. Write to Servel, Inc., Evansville 20, Ind.

Servel

UNIFIED KITCHENS
EVANSVILLE 20, IND.

The Visual Approach
In Home Service Demonstrations

By CHARLOTTE A. SEMPLE

Home Service Director, Gloucester Gas Light Co.

THERE are many methods of presenting the "Gas Story". These are divided into three classifications as follows: (1) Action; (2) Subtle or still—charts, posters, displays (sales floor); (3) Lecture.

Successful Action Methods

To define the action type or method, we must list the various types of action which we have found successful.

1. *Demonstration or Showing.* This is the type used when appliances are available and for many types of groups it is successful and of course, there are many times when some other method must be used out of necessity when the place, location, help, etc. are not available. However, it need not be reserved for the time when appliances are available. It can be used in everyday sales floor activity. It may be the making of a simple cookie or cake or holiday suggestions, but as long as something is going on to catch the eye of the public, one or many ideas are planted with the individual. She may go home and bake the cookies by the recipe or it may remind her of a recipe she had or the pleasant moment while having the cookie and chatting about her food problems and the valuable assistance gained, but as far as we are concerned, we did give a service from which much good will is gained.

The natural instinct of curiosity will stop people if some action is going on; then prospects are obtained and with an eventual raise in the gas load which is our main reason for existence. The class demonstration or group demonstration is still another method of visual education. It is not how well a cake can be put together that is important, but the fact that the range baked it to perfection. This point is so often a hidden factor. The fact that we can do a good job of broiling or baking is not the essential point, but how easy it would be for "Judy O'Grady" to duplicate the result. Simplicity of program but yet with an element of surprise, artistry and intrigue all help to make a successful program.

2. *Skits.* The use of short skits help more than a long, drawn-out dissertation on the values of an appliance over some other type and also help to put over a more complete story. The addition of new faces, action, personality, etc., add visual interest which sometimes becomes dull with one person conducting an entire program alone. The place of skits in our programs should be considered when possible, assistance is available and we have a subject that can be enacted.

3. *Moving Pictures.* Many of the large manufacturing concerns have moving pictures available for use in classes. The use of the reels is relatively inexpensive but the cost of the operating machines is almost prohibitive in some companies. However, it does seem that arrangements should be made in the future to obtain equipment for each department for use in classes or in conjunction with some other department. For instance, the companies in a district might cooperate and departments of a given company, such as home service and sales and power sales.

With the new era about to dawn, there will undoubtedly be more reels available, too. The close cooperation with sales and power sales and home service would assure the training program of being far more effective with the use of moving pictures. This type has been used extensively in the Air Force training program and has the approval of educators as being effective.

IT IS AN ESTABLISHED fact that "Visual Education" gets the story over to a group better, because 87% of our education is derived through perception. This has been proven in the education of our Armed Forces. That leaves some 13% to be distributed as 7% gained through hearing, and 6% divided in smell, taste, touch, etc. That, in its essence, determines how our programs should be constructed. The home service director who relies on talking alone, misses nearly 93% of her chances of getting a successful result. Wise is the director who enlists some aid from each of the groups! Presented before the New England Gas Association's Home Service Development Conference, Boston, Mass., Sept. 17-21, 1945.

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4. *Action Charts.* Sales floor and window displays containing action are far more arresting than still charts. They catch the eye and again the human curiosity in us all definitely makes us stop to see what is going on. One person stops and then, of course, the surge is almost bewildering. The mechanical arrangement would appeal to some and the artistry to others, but collectively it answers the purpose in getting the Gas Story across.

5. *Customer Participation.* The customer often enjoys participating in a given program. It may be only the reading of a recipe sheet as the demonstration proceeds, but it does give her a sense of feeling that she knows what is going on and a chance to look forward to coming attractions. Special market reminders, short cuts, etc., are often suggested as pass-out materials.

All enjoy the "something for nothing" element, but it should tie-in definitely with the particular program. This, if remembered, can be a most useful method of getting our presentation to really take effect. The use of these give-away pieces should be studied carefully and presented accordingly, lest we lose our point and sell a grocery instead of how well the range bakes the particular product.

6. *Games are of interest to all.* We have learned of it in school. It was always much more fun to count 2 oranges and 2 apples than to add 2 + 2. For example, the "Vitamingo" game used in checking our personal vitamins was the cleverest of games in use for a long while. You may invent your own for the special occasion.

7. *Lottery* should be considered as we all hope secretly that our names might be drawn for the luscious salad bowl or the tempting broiler grill. The ease of its preparation, the perfection in its finished product are always extolled to the winner's family. Just how far this should go must be determined by the individual department.

Charts, Posters and Displays

Nothing is so lost as action without suitable backing. This may be done with signs or it may be the person participating, doing the describing, but explanation is necessary. To go back to the percentage of education gained by hearing, it was only 7%. That, alone, answers our problem. Color must be considered as a defi-

nitely important factor. For example, red usually means stop. Soft blues and greens have a quieting effect, while yellows and oranges have a warmer tone. Combining these in posters must be done carefully and with the artistry of a master. Backgrounds, ideas, etc., must be corresponding to the theme and suitability of the seasons. We are all aware of the part the patriotic colors have played during the war. Windows have been very gay and arresting as Red, White and Blue make for a heart-warming thought of what it means.

The use of charts with lectures makes a 100%, whereas lecture alone pulls our average down near 7% of success. The roll chart must not be overdone as the customer soon wanders and secretly hopes that this page is the last to be turned. A few pages with large enough print to hold interest for a short while are quite effective. Colored ones against plain black and white are far more desirable.

Lecture

This may be useful in places without equipment but for only a short few-minute talk. Educators have definitely agreed that after seven minutes the interest of the group cannot be held unless some equipment is used. Charts, folders, booklets can again raise the 7% level to 100% by using the tremendous power of a visual aid and its 87% value.

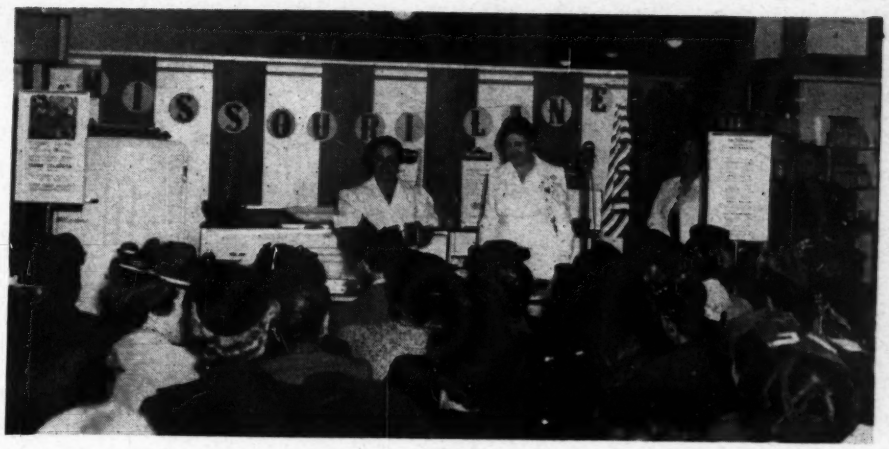
New England Group Holds Second Safety Conference

The New England Gas Association held its Second Safety Conference in Boston, Mass., recently. The first item was the motion picture "Sight Security," featuring Milton M. Bowman, Eye Safety Consultant of the U. S. Department of Labor.

Principal speakers were Clarence Young, district foreman, Boston Consolidated Gas Co., who also acted as foreman of the Conference; Charles W. Rainville, Jr., production superintendent, Salem Gas Light Co.; Hugh F. Lovering, safety assistant, New England Power Service Co., and A. C. Frey of Worcester Gas Light Co.

A survey conducted by Chairman John P. McCann, safety manager, New England Power Service Co., showed that, in addition to others, there were present 42 foremen, 23 superintendents, 17 safety engineers and three company managers.

The final and principal speaker was Edward E. Kuypers, personnel director, First National Stores, Inc. Job analysis, correction of unsafe habits, proper placement of responsibility and labor participation in the safety problems were some of the points developed by Kuypers in leading up to the conclusion that employees like to express pride in their jobs, bosses and company.



The Improvised Kitchen Setting. From left to right on the platform are Elena Zelayeta, the blind authoress; Cleo Filsinger of Pacific Gas and Electric Company, and Charlotte Sloan, Wedgwood gas ranges.

Department Store Promotion of Gas Appliances

THE first "store promotion" cooking school in the San Francisco District took place at the Emporium in San Francisco, September 10 to 15. Its success indicates clearly that women are more interested than ever in cooking and home making, as the five day attendance of 1500 topped all pre-war records of the drawing power of similar events in the same department.

The event was held in an improvised kitchen set-up in the third floor appliance department. It was styled the "Missouri Lane" Household Fair and was advertised in a double page spread in Shopping News for September 10, half pages in San Francisco newspapers on the 10th, 11th and 12th and a full page in Shopping News on the 13th. The cooking school was sponsored by Cleo Filsinger, home economist of the Pacific Gas and Electric Co., who acted as master of ceremonies introducing the specialists who featured each day's program.

Among these specialists were Anne Martin of the Roma Wine Company, who talked on Adventures in Dining; Elena Zelayeta, the sightless chef and author, who demonstrated Fiesta Meals and manipulated the gas range better than most women who can see; Gladys Mason, Sperry Division of General Mills, who described "Variety Breads for Interesting Meals"; Mary Lou Armstrong, National Livestock and Meat Board, who discussed "Tender Ways with Meats." Mrs. Filsinger and Charlotte Sloan, who represents the Jas. Graham Manufacturing Co., makers of Wedgewood gas ranges, demonstrated on one day the water bath method of home canning. Each day Charlotte Sloan demonstrated low temperature baking and flavor and vitamin saving simmer cooking.

Decorations carried out the fair carnival motif. Colorful posters of the Fair Barker were placed in store windows, elevators, etc. The appliance department was hung with red and white pennants, and a red and white color scheme was used in covers for the merchandise tables, lamp shades and merchandise markers.

Household products in great variety were demonstrated in the department. Some of the demonstration was of samples of articles not yet available for sale. A Wedgewood gas range was used in the cooking demonstration.

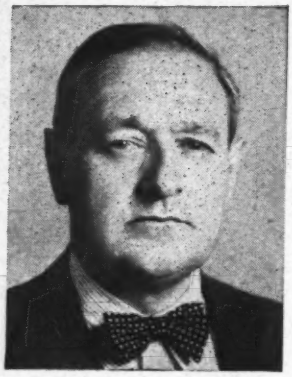
The attendance greatly exceeded expectations, as was evidenced by the fact that at the opening session 100 chairs were in place. The average daily attendance was 300 and would have been higher if room had been available.

The audience interest was very pleasing to the store management although at times somewhat embarrassing due to the complete "sell out" of items still available in limited supply. An interesting sidelight was the "sell out" of Elena Zelayeta's cookbook in the book department on the first floor.

Texas Adopts New Safety Rules for Butane Gas

Regulations for handling butane gas have been signed by the Texas Railroad Commission under the new law designed to increase safety.

Attorney General Grover Sellers approved the form of Indemnity bond for persons holding liquefied-petroleum gas licenses. It provides for payment of up to $10,000 for any person killed or injured in an accident resulting from negligence on the part of the licensee or his agent, besides property damage insurance.



PROMOTIONAL NOTES and NOTIONS

By STANLEY JENKS

More Selling Needed

It is no secret to readers of this page that I was never too hilariously happy about this so-called "pent-up" demand for appliances that was dangled so temptingly before our war-weary eyes.

There is no question that the war years and the lack of civilian production have produced a need for new gas appliances large enough to tax the capacity of our manufacturers for some time to come. But, as George S. Jones, Jr., vice president of Servel, Inc., has emphasized elsewhere, there needs to be an adjustment in our perspective. A wild scramble for appliances has not developed. People are shopping for gas and electric appliances, looking for values "influenced to a large degree by economic conditions and fear of the future," as Mr. Jones puts it.

A situation is being created where the gas appliance salesman must do his stuff, if we are to get our share.

Incidentally, how much of the millions of dollars lost in wages by the G.M. strikers would otherwise have been spent on gas appliances?

Publicize The Facts

Public opinion in a democracy is all-important, because its political effects are basic. Facts in themselves are of no value if the public is ill-informed. To put it mildly, much of our economic trouble today can be laid directly on the doorsteps of professional radio and newspaper sensationalists, who literally say anything to get an audience; selfish and self-interested groups, who conceal or distort facts to gain advantages at the expense of others; and the indifference of those with the facts in presenting them intelligently to the public they serve.

The principle of private utility ownership and management is increasingly under attack by people, many of whom have definitely ulterior motives. However, a surprisingly large number of public ownership proponents are sincerely convinced that the public interest will be better served with the politicians running the show. I submit that they think this way in too many instances because the real accomplishments of private utility management are not properly presented.

Every utility operator is familiar with the time-worn examples of smart-alecky adjustment clerks, discourteous fitters, and arbitrary minor officialdom. Then there used to be the self-glorification so-called "Goodwill" advertisements, which as a rule were nothing more than a verbose monument to the self-esteem of a front office brass hat.

The facts—none of this highfaluting stuff—are there and only need simple expression. An advertisement from the British newspapers, run by a privately owned electric utility, is a typical example, as shown below translated into American units.

There is no effective argument against that kind of fact-laden publicity.

HOW'S THIS FOR FREE ENTERPRISE?

This Group of 16 Power Companies Serving One-Quarter of England and Wales Submit the Following War Record:

Units Sold to Own	1939	1944
Customers	$957,000,000	$2,305,000,000
Revenue	20,000,000	44,000,000
Taxes Paid	380,000	4,308,000
Price Paid for Coal Per Ton	$5.00	$9.25

Not One Rate Has Been Increased—Some Have Been Reduced.

The Average Price for Domestic Service Was Reduced 30%.

The Net Profit of the Group Was Reduced From $2,340,000 to $2,140,000.

Fuel Usage

The statistics presented in a compendium of a report soon to be issued by the combined Production and Resources Board of the United States, Great Britain and Canada are presented primarily to show the impact of war on civilian life and production in the countries concerned.

The pre-war and wartime per capita figures on fuels are of passing interest to us in the gas industry, because first and foremost we are in the heating business. (If it's done with heat, you can do it better with gas.)

The all-fuel per capita usage in the United States jumped from 33,300,000 Btu's in 1939 to 39,500,000 Btu's in 1944. According to my figures, as abstracted from the 1944 A.G.A. annual statistical reports of the manufactured and mixed gas and natural gas industries, 19,640,000 customers purchased for home use 858,556,000,000,000 Btu's, taking a cubic foot at 500 Btu's for manufactured and mixed, and 1000 Btu's for natural. This works out at 43,714,660 Btu's per customer, which at 4.5 individuals per customer, gives us a per capita gas consumption of approximately 9,714,000 Btu's.

If the old slip stick isn't lying, this indicates our share of the heating business in the United States amounted to 25.2%, which still shows plenty of opportunity for our superior fuel.

PUBLIC PREFERENCE SURVEY On Home Appliances

Sunset Magazine Survey Shows Growing Trend Toward Electric Ranges

AN ANALYSIS of a consumer opinion on various home equipment items conducted by the Research department of "Sunset" Magazine prepared by Clifford Johnstone, managing director, Pacific Coast Gas Association.

SUNSET Magazine, which has a circulation of 250,000, largely confined to the Pacific Coast states, early in 1945 asked its readers their opinion and buying intentions toward various items of home equipment. Previous surveys have indicated that the magazine is widely read by substantial people interested in homemaking. Some 90% of its subscribers live in single family dwellings and over 80% own their homes. Nearly 40% plan to buy or build new homes within two years after the war.

The home equipment survey is based on 10,000 mailed questionnaires, 3389 of which were returned and 3251 used in making the tabulation. Results are segregated as to North (mostly Oregon and Washington), Central (mostly northern California) and South (mostly southern California). While the figures may be somewhat distorted from the gas viewpoint due to the inclusion of an undetermined number of rural off-the-gas-lines replies, the survey is an excellent cross section of comfortably situated families who are interested in their homes.

Heating

Expressed to the nearest even per cent these *Sunset* subscribers' homes are now equipped as follows:

		% using Gas
Fireplace	64%	24
Floor furnace	30	90
Portable heater	20	41
Circulator	22	52
Hall heater	14	61
Central heating	41	61

The influence of cost, climate and sales effort is reflected in the segregation between North, Central and South. In central heating 92% use gas in the South, 84% in the Central, and 9% in the North. In the North (a manufactured gas area) the principal competitors are oil, coal and wood in that order.

Some 19% plan to buy heating equipment at the first opportunity. 47% of these will buy central heating and 21% floor furnaces. Warm air is most popular in all zones. In the North only 7% will be gas, 69% in the Central zone, and 70% in the South. The principal competitor in the North is oil (68%) with electricity (26%) a poor second. It is also oil (18%) in the Central zone with electricity next (17%). In the South electricity is 22% and oil 9%.

Complete air conditioning has caught the imagination of these people and 80% are interested in it.

Cooking Ranges

Pertinent data on existing kitchen ranges and on buying intentions are summarized in Table 1. Figures are to the nearest even per cent. Fuels used in combination ranges are included in the proper fuel column.

The apparent trend toward electric range popularity is probably due to the volume and quality of the advertising and promotion of this appliance as compared with gas ranges. This has been 12-1 nationally for many years before the war. This survey, like so many others, points to the necessity of gas industry cooperative advertising as well as greatly augmented individual company sales and advertising effort.

Water Heaters

Data on existing water heating facilities is tabulated in Table 2.

In view of the Association's current effort to encourage the use of larger water heater capacity it is interesting to note that in these better class homes 43% of present storage water heaters are 20-30 gal. capacity, 34% are 30-50, and 10% are over 50. Only 4% are below 20 gal.

The small percentage of those existing home owners planning to buy water heaters reflects the availability of replacement heaters throughout the war. The trend toward electricity is not so marked as in ranges, but is disdisturbing considering the actual inferiority of the electric water heater to gas. Here again it is the weight of advertising and the glamor of radar, electronics, etc., that is influencing the public toward anything electric.

Washing Machines

This survey proves the claim of our Water Heater Council that dishwashers and automatic washing ma-

TABLE 1. DATA ON EXISTING KITCHEN RANGES AND BUYING INTENTIONS OF SUNSET READERS

	North	*Central*	*South*	*All*
Fuel used—%				
Electricity	76	18	19	29
Gas	13	81	82	68
Other	21	20	1	11
Combination	7	13	1	6
Age of present stove—years				
1-5	39	35	30	33
5-10	37	39	47	42
Over 10	23	26	24	24
Oven heat regulator—%	92	89	90	90
Clock or timer—%	49	29	46	40
Postwar Buying Intentions				
	North	Central	South	All
Planning to buy a new range	23%	21%	20%	21%
Electric	89	44	44	53
Gas	9	58	58	47
Other	5	3	....	2
Expect to pay over $150	43	51	39	44
Want oven regulator	87	89	89	88
Want clock	53	37	46	44

TABLE 2. DATA ON EXISTING WATER HEATING FACILITIES AND BUYING INTENTIONS OF SUNSET READERS

	North	*Central*	*South*	*All*
Stove Coil	10%	27%	18%	11%
Furnace coil	20	.....	.....	17
Storage heater	21	27	55	24
Instantaneous heater	18	18	18	18
Other	31	27	9	29
Fuel used				
Electricity	71	9	8	19
Gas	20	89	92	79
Other	8	2	....	1
Age of present heater—years				
1-5	50	42	43	44
5-10	33	37	39	37
Over 10	17	20	18	19
Postwar Buying Intentions				
	North	*Central*	*South*	*All*
Plan to buy at once	21%	12%	9%	12%
Fuel				
Electricity	86	25	27	37
Gas	10	76	74	63
Other	6	3	1	3

chines will be popular postwar.

Only 2% of the *Sunset* families now own dishwashers but 60% will buy as soon as available; 43% expect to get them for less than $100.

Of these families, 95% do some of their laundry at home, and 63% do all of it. Seventy-eight per cent now own washing machines and 28% ironers; 33% will buy washing machines and 18% will buy ironers.

Refrigerators

Of *Sunset* subscribers, 92% own mechanical refrigerators of which 21% are more than 10 years old. In the northern zone 2% are gas, in the central zone 5%, and in the south 22%. Twenty-two percent are ready to buy new boxes, and 17% of these will buy gas refrigerators. By zones the preference for gas is 4% in the North, 8% in the Central, and 30% in the South.

This fuel preference trend, reversing that on ranges and water heaters, reflects the excellence of the national promotion of our one gas refrigerator manufacturer. In the case of the refrigerator, the superiority of gas has been impressed upon the public. The many superior features of gas ranges and gas water heaters have not.

Conlon Corp., Chicago, Now Controls Moore Corp.

Bernard J. Hank, president and chairman of the Conlon Corp., Chicago, maker of electric household appliances, recently announced that Conlon has purchased control of the Moore Corp., Joliet, Ill.

Hank will become chairman of the board of the newly acquired concern and E. K. Priest, Joliet, who has headed the company for six years, continues as its president. Louis R. Peyla, president, Illinois Securities Co., Joliet, continues as vice president and director.

The Moore concern manufactures both gas and coal, circulating and radiating heaters for gas, coal and oil furnaces, and combination coal and gas, coal and wood, and oil and gas ranges. Plant facilities will be expanded as soon as possible.

Burton Behling To Direct Natural Gas Investigation

The Federal Power Commission recently announced the appointment of Burton N. Behling, special assistant to the Commission, to act as director of the Natural Gas Investigation, Docket G-580, and the resignation of George Slaff as chief counsel for the investigation. Behling has been a member of the Commission's staff since September 1944 and has been active in the investigation. Slaff resigned to accept a position as counsel for Goldwyn Productions, Inc.

Tappan Awards Prizes In Range Contest

Tappan Stove Co., Mansfield, Ohio, has awarded prizes totaling $275 in the recent contest "Ideas for Research on Liquefied Petroleum Gas Range". The contest was conducted among Tappan liquefied petroleum gas dealers who expressed their ideas on development of the Tappan LP-gas range.

A.G.A. Advertising Theme Will Be Retained

The AGA Sub-committee on Approval of Domestic Copy, at a recent meeting in St. Louis, voted to retain its present advertising campaign with a slight shift of emphasis in the March or April insertions of the "New Freedom Gas Kitchen" ads. Text will contain more specific selling copy on the latest developments to be found in new gas appliances coming on the market.

SALES SHORTS

• **"The Scientific Selection of Salesmen"** by J. L. Rosenstein, director of Personnel Research Foundation and vice president of the Sheldon School, Chicago, is a new book based on techniques used over a period of 10 years and on studies made among more than 15,000 sales applicants and employed salesmen. It has 259 pages and a number of charts and tables, selling for $3.00 and is published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y.

Other books on sales recently published by McGraw-Hill are **"How to Run a Sales Meeting"** by Edward J. Hegarty, **"Basic Problems of Sales Management"** by Frank LaClave and **"Selling With Color"** by Faber Birren.

• **The Cleveland Heater Co.**, Cleveland, has prepared a 23-page booklet, "The Home Appliance Market", designed to help every young man ready to make salesmanship his career and to assist employers in selecting and training men to sell products in the home appliance field.

The booklet is illustrated and is available from The Cleveland Heater Co., 2310 Superior Ave., N.E., Cleveland, Ohio, in lots of 100 or more at 10c per copy, imprinted with your name and address on the cover.

• **Tappan Stove Co.**, Mansfield, Ohio, has issued a 32-page portfolio which presents future dealer helps, according to an announcement by C. V. McConnell, vice president. Highlights include an illustration of a Tappan "Yucatan Eclipse" range in use for over 50 years by an Ohio woman, national advertising, expanded plant facilities, kitchen planning, prospect building, etc. A brief of the portfolio may be obtained by writing R. J. Hammer, advertising manager.

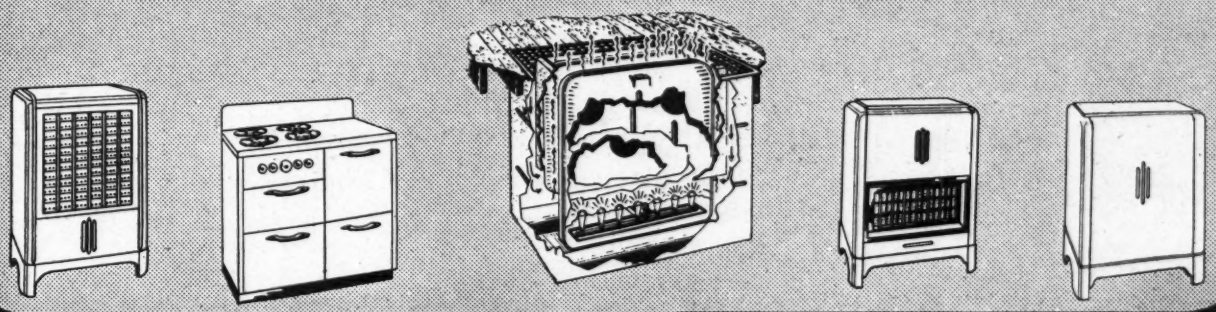
• **The Peoples Natural Gas Co., Equitable Gas Co.**, and **Manufacturers Light & Heat Co.**, all in the Pittsburgh district, sponsored a contest in a number of theaters during November and December with 23 Servel gas refrigerators as prizes. Promotional activities in connection with the contest reached approximately 3,000,000 people in six weeks.

• "Let's Sell Again" is the title of a spiral-bound booklet issued by **John H. Taylor**, director of dealer development of British Columbia Electric Railway Co., Ltd. The booklet defines the utility's market, states its merchandising policy, and outlines the services it plans to extend to dealers in merchandising gas and electric appliances.

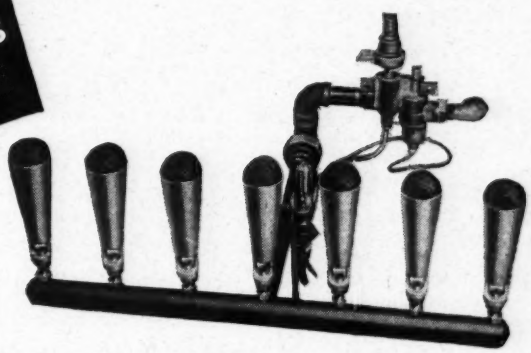
• **Consolidated Edison Co.**, New York, has equipped a display truck with household appliances in an effort to bring the "store" to the householder, enabling him to choose his equipment on the spot.

• The first postwar American kitchen sinks and cabinets rolled off the assembly line at the plant of the American Central Manufacturing Corp., Connersville, Ind., Nov. 26, according to an announcement by C. Fred Hastings, general sales manager.

Plan *Now* to sell the *Empire* line with the remarkable new *Empire* GAS BURNER



Performance of this Burner Gives
EMPIRE'S HEATING APPLIANCES
EXTRA SALES VALUE



Gas FLOOR FURNACE Orders Now Being Accepted

NON-RADIANT GAS CIRCULATOR HEATERS

Ready in February

Ready Later:

Gas RANGES, GAS RADIANT CIRCULATOR HEATERS, FORCED-AIR CIRCULATOR HEATERS and CLOSET-TYPE GAS Furnaces

Empire Stove Company

BELLEVILLE, ILL

MANUFACTURERS OF GAS HEATING AND COOKING APPLIANCES

ASSOCIATIONS

F. R. Rauch Named Chairman of Personnel Committee

Fred R. Rauch, director of industrial relations, The Cincinnati Gas & Electric Co., has been appointed chairman of the personnel committee of the American Gas Association according to an announcement by **President Everett J. Boothby.**

F. R. Rauch

Rauch was employed by the federal government for eight years in engineering, labor relations and executive positions and was a member of the original labor management committee of the Office of Production Management. He is a member of the industrial relations committee of the Edison Electric Institute, and of the American Management Association.

The A.G.A. personnel committee is engaged in a continuous study of industrial relations problems and is in its 10th year as an Association activity.

Gas Reserves Committee To Issue Annual Report

Authoritative and dependable estimates of natural gas reserves in each of the five gas-producing regions of the country, as well as for the entire nation, will be available to the gas industry, to utility analysts, to investors and to the consuming public, N. C. McGowen, president of United Gas Pipe Line Co., Shreveport, and chairman of the committee on Natural Gas Reserves of the American Gas Association, announced after the organization meeting of his committee.

The committee hopes to have its first report ready for presentation at the annual A.G.A. meeting in Atlantic City in October, 1946. Subsequent annual reports will be prepared, if possible, for release in conjunction with the annual spring meetings of the A.G.A. Natural Gas department.

American Bar Association Symposium on Natural Gas

A symposium on natural gas, its regulation and utilization, was a feature of the mineral law section of the American Bar Association meeting in Cincinnati the week of Dec. 21.

James B. Sayers of the Pittsburgh bar discussed "Legal Problems Presented by the Underground Storage of Natural Gas". Wallace Hawkins, Dallas, in an address entitled "The Natural Gas Act and the Oil and Gas Producer," warned against federal encroachment on the regulation of production, gathering and conservation of natural gas by the states and the tendency to give public utility status to gas production.

Tom McGrath, Washington attorney for coal, railroad and union interests, in a paper entitled, "The Competitive Fuel Viewpoint," urged curbing the use of natural gas in competition with coal. Former Governor Jones of Louisiana explained his state's anti-export policy and asserted the belief that "it was our insistence that brought about the present national natural gas investigation by the Federal Power Commission."

Governor Schoeppel of Kansas spoke on "Some Aspects of State and Federal Regulation of Natural Gas," pointing out that laws pertaining to natural gas regulate it to prevent waste and also class it as a public utility, and that these two types of regulation are in direct conflict.

Alvin H. Stack Elected Director of A.G.A.

Alvin H. Stack, president, Tampa Gas Co., has been elected a director of the American Gas Association, to fill a vacancy caused by the election of Hudson W. Reed, president, Philadelphia Gas Works Co., as vice president of the Association, it was announced by Everett J. Boothby, president of the A. G. A.

James A. Brown, vice president, Commonwealth & Southern Corp., was elected chairman of the finance and control committee, which supervises all expenditures of the A. G. A. Members of the committee elected were: Frank H. Lerch, Jr., president, Consolidated Natural Gas Co.; R. E. Ramsay, president, New Haven Gas Light Co.; Paul R. Taylor, vice president, Consolidated Electric & Gas Co.; and P. S. Young, chairman of the executive committee, Public Service Electric & Gas Co. Ex-officio members of the committee are: Everett J. Boothby, R. H. Hargrove, and Hudson W. Reed, president and vice presidents, respectively, of the American Gas Association, and Ernest R. Acker, president, Central Hudson Gas Co., who is chairman of the Association's committee on research and promotional plan.

Measurement Short Course Set for April 23-25

Plans for a bigger attendance and for expansion of international representation are being made for the 1946 Southwestern Gas Measurement Short Course by the general committee, which met recently at Dallas, Texas, and set the dates for April 23, 24 and 25 at Norman, Okla.

Notwithstanding wartime restrictions, the 1945 short course drew 594 registrants from 25 states and Canada. To further this expansion, membership of industrial representatives on the general committee was expanded from 10 to 12. Nine geographical areas were designated, with one committee member from each and three at large.

The executive committee, at the Dallas meeting, elected the following committee chairmen: Program committee—R. M. Scofield, Lone Star Gas Co., Dallas; Publications committee—C. E. Terrell, Southern Natural Gas Co., Birmingham; Exhibits committee—J. L. Griffin, Northern Natural Gas Co., Omaha; Registration and Publicity committee—Miss Kate A. Niblack, Oklahoma Utilities Association, Oklahoma City; Local Arrangements committee—W. H. Carson, Dean, School of Engineering, University of Oklahoma, Norman; Practical Methods committee—W. Woods, Gulf Oil Corp., Houston.

CALENDAR

January

American Gas Association Southwest Personnel Conference—New Orleans, Jan. 11.

Quarterly meeting, Executive Committee, Independent Petroleum Association of America—Shreveport, Jan. 15-16.

New England Gas Association Operating Division Meeting—Salle Moderne, Hotel Statler, Boston, Jan. 17.

Federal Power Commission's Natural Gas Investigation Hearing—Houston, Texas, Jan. 28.

Independent Natural Gas Association Annual Membership Meeting—Texas State Hotel, Houston, Jan. 28.

Gas Appliance Manufacturers Association, Gas Water Heater Division—Denver, Jan. 29-30.

February

Pennsylvania Gas Association, Midwinter Sales Conference—Place to be selected, Feb. 1.

National Metal Congress and Exposition—Cleveland, Feb. 4-8.

Federal Power Commission's Natural Gas Investigations—Biloxi, Miss., Feb. 11 and Chicago, Feb. 19.

Technical Conference on Domestic Gas Research—Cleveland, Feb. 18-19.

March

Federal Power Commission's Natural Gas Investigation—Charleston, W. Va., March 19.

Southern Gas Association—Galveston, Texas, March 21-22.

New England Gas Association—Boston, March 21-22.

American Gas Association Conference on Industrial and Commercial Gas Section—Commodore Perry Hotel, Toledo, March 28-29.

April

Mid-West Gas Association—Place to be selected, April 8-10.

American Gas Association Distribution and Motor Vehicle Conference—Hotel Stevens, Chicago, April 16-18.

Southwestern Gas Measurement Short Course—Norman, Okla., April 23,25.

May

American Gas Association Natural Gas Department, Annual Spring Meeting—Hotel Gibson, Cincinnati, May 7-8.

National Association of Corrosion Engineers Annual Meeting—President Hotel, Kansas City, Mo., May 7-9.

June

American Gas Association Joint Production and Chemical Committee Conference—Hotel Pennsylvania, New York City, June 3-5.

National Fire Protection Association—Boston, June 3-6.

Canadian Gas Association, 39th Annual Convention—Mannoir Richelieu Hotel, Murray Bay, Quebec, June 18-21.

October

American Gas Association Annual Convention and Exhibit—Atlantic City, N. J., Oct. 7-11.

Lefferson Again Heads A.G.A. Rate Committee

L. R. Lefferson, head of the rate department of Ebasco Services, Inc., New York, has been reappointed chairman of the rate committee of the American Gas Association by **Everett J. Boothby,** president.

L. R. Lefferson

Lefferson served as a member of the A.G.A. rate fundamentals committee until it was discontinued in 1935. Since 1939 he has been a member of the Association's rate committee and was appointed its chairman last year.

The rate committee will continue its studies of extent and nature of state commission rate regulation in post-war period; latest developments in temporary or permanent rate reductions; rate levels necessary to hold residential cooking and water heating loads; rate practices with bi-monthly billing; rates for multiple dwellings and housing projects; payment incentive provisions in rate schedules; rates for space heating; methods for determining that portion of a natural gas company's business subject to FPC jurisdiction; rate practices in connection with interruptible gas service; fuel clauses; value of service concept in rate making; and A.G.A. rate service and possibilities for improvement.

A.G.A. and East Ohio Gas Sponsor Gas Center

The American Gas Association and The East Ohio Gas Co. are jointly sponsoring the Industrial Gas Center at the first postwar National Metal Exposition and Congress which will be held in Cleveland, Feb. 4 to 8, 1946. The exposition and congress will afford industrial gas men and manufacturer representatives an opportunity to study latest industrial heat applications, new ideas and developments in industrial gas utilization, and new equipment and processes.

NEGA Annual Conference Scheduled for March

The 1946 annual business conference of the New England Gas Association will be held on Thursday and Friday, March 21 and 22, at Hotel Statler, Boston. The NEGA directors recently voted to return next March to the 2-day, 4-session type of conference which was held prior to 1943.

AGAEM Simplifies Name

H. Leigh Whitelaw, managing director of the Association of Gas Appliance and Equipment Manufacturers, recently announced that the name has been changed to Gas Appliance Manufacturers Association. Membership in the Association totals 296 manufacturers of gas appliances and equipment, who represent approximately 80% of the total volume of such equipment manufactured in the United States and Canada.

Residential Section Completes

Regional Sales Meeting

THE Residential Gas Section of the American Gas Association last month completed a series of 31 meetings designed to assist the gas industry in organizing its postwar sales and promotional activities. The meetings, conducted by F. W. Williams, secretary of the Residential Gas Section, and R. E. Williams, sales manager of the Binghamton Gas Works Co., Binghamton, N. Y., and chairman of the committee on Selection and Training of Sales Personnel, were attended by more than 3000 utility company executives, salesmen, gas appliance manufacturers and dealers.

One feature of the meetings was the presentation of the "All Gas Merchandising Program" sponsored by Surface Combustion Corp., Toledo, and focused on residential uses of gas to facilitate the sale of "all gas" service for the home.

H. P. Morehouse, Public Service Electric and Gas Co., Newark, presented the "Reference Manual of Modern Gas Service" which contains the latest information on the installation of modern gas service in new homes. The manual includes concise, authentic data on sizing, specifying and installing domestic gas appliances and typical architects installation specification sheets. The manual will be available to the industry in February.

James I. Gorton, "CP" promotional director of GAMA, said that gas ranges built to "CP" standards offer companies an opportunity to replace obsolete gas ranges on their lines and present dealers with a great merchandising opportunity.

"A Preview of Things to Come" featured the Servel unified all gas kitchen program which is part of the New Freedom Gas Kitchen program. The discussion included a series of charts showing the gas refrigerator models now in production, the new eye level storage section, the food conditioning unit built over the gas refrigerator, and the air control cabinet built over the gas range to remove heat, moisture and cooking odors from the kitchen.

Executives of Ruud Manufacturing Co., Pittsburgh, stressed the opportunity which exists for the gas industry to increase gas loads through the sale of automatic gas water heaters to customers owning automatic home laundry equipment.

The Residential Gas Section's indoctrination course for all gas company employees included "The Fundamentals of the Gas Industry" and the specialized sales training course in "Residential Gas Salesmanship." These training programs stress the fact that the gas industry must train its sales personnel thoroughly in order to obtain its share of the consumer dollar.

Columbia Gas Combines All Eastern Groups

Stuart M. Crocker, president of Columbia Gas and Electric Corp., has announced that as a further step in simplification, two of the company's operating groups will be combined under one management. Top officials in the new organization will include Harry A. Wallace, Jr., now president of the Charleston group, as president, and Oliver S. Hagerman, now president of Seaboard as vice president and general manager.

Columbia's Seaboard subsidiaries, operating through Kentucky, West Virginia, Virginia and Maryland, will become part of the system's Charleston group which has production, transmission and distribution properties in West Virginia, Kentucky and Ohio.

FPC Authorized Additional Gas From Carthage Pool

The Federal Power Commission has authorized the United Gas Pipe Line Co. to transport a maximum of 172,000 Mcf of natural gas per day from the Carthage, Texas, field to the Monroe, La., field to serve its present customers, the Memphis Natural Gas Co., Southern Natural Gas Co. and Mississippi River Fuel Corp., and to United Gas Corp. for resale in Calhoun, La. This gas is in addition to the 114,000 Mcf per day which United was originally authorized to transport for the Tennessee Gas and Transmission Co. over the Carthage-Sterlington pipeline.

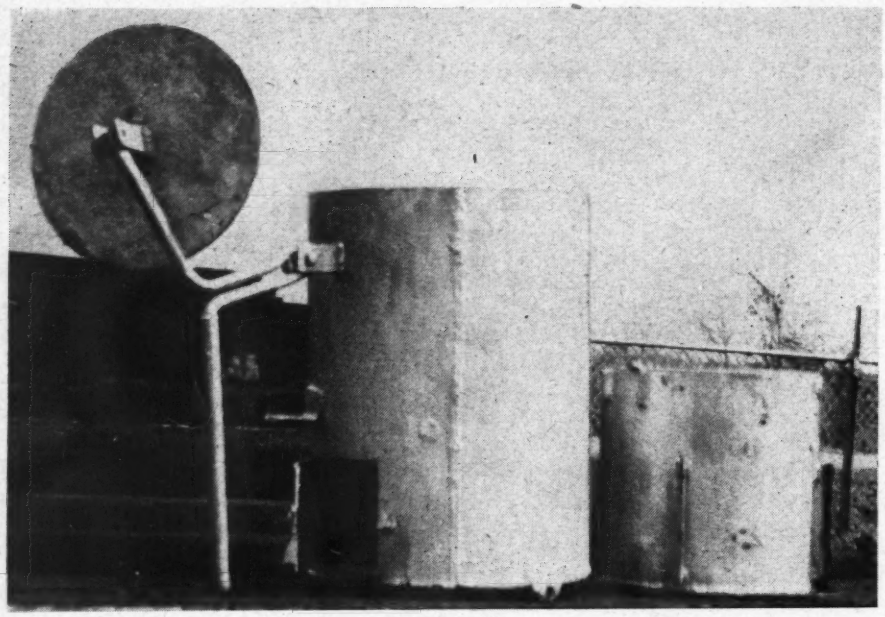
Edward Valve & Mfg. Co., Inc. Simplifies Name

The Edward Valve & Mfg. Co., Inc., East Chicago, Inc., a subsidiary of the Rockwell Manufacturing Co., has been renamed Edward Valves, Inc. In announcing the change, Col. W. F. Rockwell, chairman and president of Rockwell Manufacturing, emphasized that it was a matter of simplification for marketing purposes and that no change in personnel or sales policies was planned. W. F. Crawford continues as president.

Edward Valves, Inc. builds steel valves exclusively and has been a leader in production of high pressure and high temperature valves for more than 40 years. Expansion of manufacturing facilities is already under way.

OPERATING IDEAS

Portable Dope Pot for Bonding



A safety feature of the portable dope pot is its pivoted handle, enabling the operator to stand clear of flame and fumes.

V. E. TURNER, section foreman, New Orleans District, United Gas Pipe Line Co., Shreveport, La. Reprinted from the "United Gas Log," March, 1945.

CATHODIC protection of coupled pipe lines requires bonding of successive joints of pipe because rubber gaskets in the coupling units act as insulators against the flow of current through the entire line.

The bonding itself is a simple operation, but it necessitates removal of a small area of enamel coating in order that an effective connection can be made to "jump" each coupling.

The very purpose of the protection is hampered unless the enamel is replaced, and, although a very small amount of hot dope is needed for each bond, hot doping the connections has, until recently, constituted the chief bottleneck to speed in bonding operations. This, because dope pots used in ordinary pipe coating are bulky and unmanageable over distances covered in a day's time by the bonding crews.

Practical points of this portable hot dope pot for bonding purposes were demonstrated when it was successfully used in recent bonding operations on the Baton Rouge-New Orleans lines.

The accompanying illustration shows the dismantled parts of the dope pot. Its main shell is built of 24-in. junk pipe with the fire box in the bottom section and with lugs welded about midway inside to support the removable dope container.

The dope container is constructed of 20-in. pipe with fins to hold it rigid and yet permit draft and flame between its outer wall and the inner wall of the main shell. The cover fits over the container only, thereby offering no obstruction to the draft.

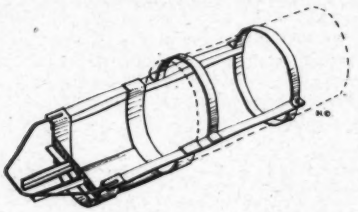
The long, pivoted handle on the cover was designed with a thought for the safety of the operator who stands well away from the flame and the fumes while opening and closing the pot.

Outstanding among the features of this innovation among hot dope pots is the ease with which it can be loaded on pick-up truck or wagon and transported from one bonding job to another without extinguishing the fire. Thus, the dope is always hot, and no time is lost in kindling new fires and reheating. Wood found along the right of way supplies the only fuel required.

Go-Devil Inserter

MARION F. POTTS, division welder, Panhandle Eastern Pipe Line Co., Paola, Kans.

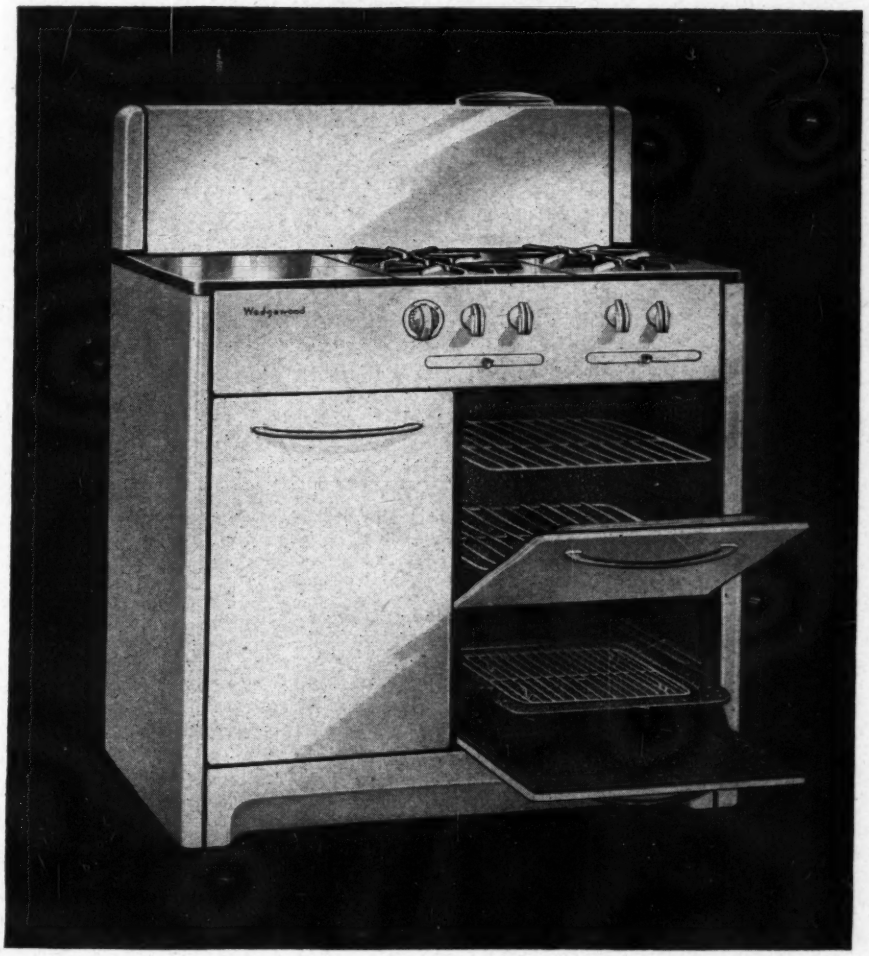
This invention saves five man-hours and the use of a truck. It has already been used successfully in cleaning



Panhandle's Haven lines 100 and 200. In the drawing it will be noted that the device is a cradle used to insert a go-devil or scraper into the pipeline.

Backfill, not so long ago a tedious shovelling job, is done quickly and easily with the above apparatus used by Southern Counties Gas Co., Los Angeles. Compressed air furnishes the motive power to pull the scraper. The boom on which a pulley is mounted is carried on the truck and can be quickly set up and dismantled. The equipment is used on small jobs.

WEDGEWOOD'S LOW TEMPERATURE OVEN



TENDERIZES EVEN THE *Cheaper* CUTS OF MEAT

● Western women since 1882 have discovered that WEDGEWOOD'S superior oven gives the very finest baking results, with utmost ECONOMY of operation. WEDGEWOOD'S Low Temperature Oven helps retain the natural juices, the delicious flavor, the delicate tenderness of even the cheaper cuts of meat.

MODERNS PREFER GAS

WEDGEWOOD *gives real* RESULTS

● For Low Temperature Baking, Broiling, or Top-of-Stove cooking, WEDGEWOOD gives definitely superior results. That is the reason for the continued preference given WEDGEWOOD by enthusiastic Western women.

FOR ALL GASES, INCLUDING LP (LIQUEFIED PETROLEUM) GAS

WEDGEWOOD THE MODERN GAS RANGE

JAMES GRAHAM MANUFACTURING CO.

LOS ANGELES ★ SAN FRANCISCO ★ NEWARK, CALIFORNIA ★ PORTLAND, OREGON

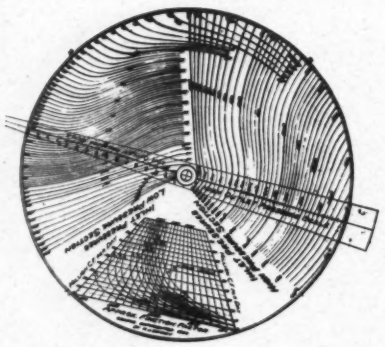
NEW PRODUCTS

Gas Pipeline Computer

Willsonn Computers, 25 Central Ave. Extension, Oil City, Pa.

Model: Willsonn Pipeline Computer.

Application: A new gas pipeline computer has been introduced to the gas and oil industry which is designed to overcome practically all of the shortcomings of gas pipeline computers heretofore available. In addition to being valuable in the design and layout of new lines the computer provides easy determination of the coefficient of friction, efficiency and "experience



factor" of operating gas pipe lines. This device eliminates the pencil work formerly necessary in solving problems involving the difference of squares of absolute inlet and outlet pressures. It also incorporates much of the later research work relative to pipeline flow and thus permits solution of problems by either the Weymouth Formula or the General Pipeline Flow Formula. Operation of the computer is simple.

Description: The Willsonn Pipeline Computer claims the following features: 1. Volumes in both daily and hourly rates; 2. Lengths in both feet and miles; 3. Scales for correction of coefficient of friction, gravity of gas, and compressibility or expansibility of the gas; 4. Graphs showing coefficient of friction and Reynolds Number; 5. Pressure range 30 in. mercury vacuum to 200 lbs. psi; 6. Volume range to 500 million cu. ft. per day and higher; 7. Sizes of pipe, both nominal and actual, 1 in. to 30 in. diameter; 8. Table of pressures and squares of corresponding absolute pressures 30 in. vacuum to 2000 lbs.; 9. Booklet of directions containing useful graphs and a treatise on the subject of gas flow through pipe lines. Computer is 7½ in. diameter and constructed primarily of durable sheet plastic material.

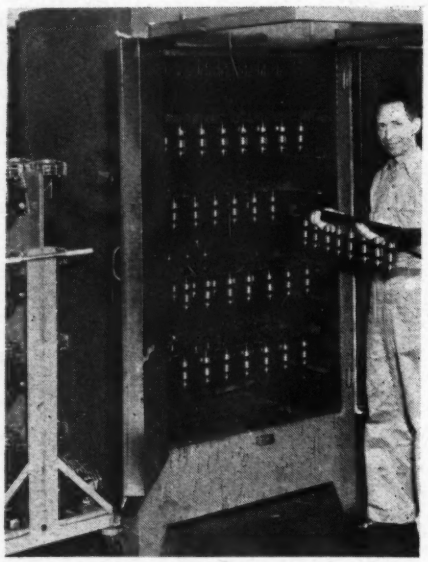
Operation: Computer operates on a circulator slide rule principle and permits rapid solution of the following problems: Determination of the rate of flow of gas; inlet or outlet gauge pressures; size or length of pipe to deliver a desired rate of gas; equivalent lengths and diameters of pipe of common capacity; capacity of a looped system; friction factor of an operating line (General Formula only); efficiency and "experience factor" of an operating line.

Industrial Oven

Despatch Oven Co., Minneapolis 14, Minnesota.

Model: RS Industrial Oven.

Application: Adaptable for all baking and drying processes up to 500 F., speed baking by as much as 50%. These ovens are now successfully in use on radio, radar, coil and armature drying and baking, carbon embrittlement and aluminum aging, baking a



variety of synthetic finishes, Japans, varnishes, lacquers, enamels, and all kinds of dehydrating and drying.

Description: Units are self-contained and require only lead-in of gas or electricity for complete installation. A special loading dolly and shelf arrangement permits easy loading and maximum use. Automatic controls and quick starting make oven readily adaptable from one type of operation to another. Special safety features and complete insulation insure comfort and health of workmen. Uniform temperature, high volume air flow, and controlled volatile exhaust assures quality and uniformity of processing, as well as reduction in baking time.

Catalogs

• **The American Lava Corp.,** Chattanooga, Tenn., has recently published a new bulletin (No. 444) describing AlSi-Mag Ceramic insulator bodies and their uses. This bulletin should prove useful to engineers, designers and research men, as well as being a helpful guide for purchasing agents.

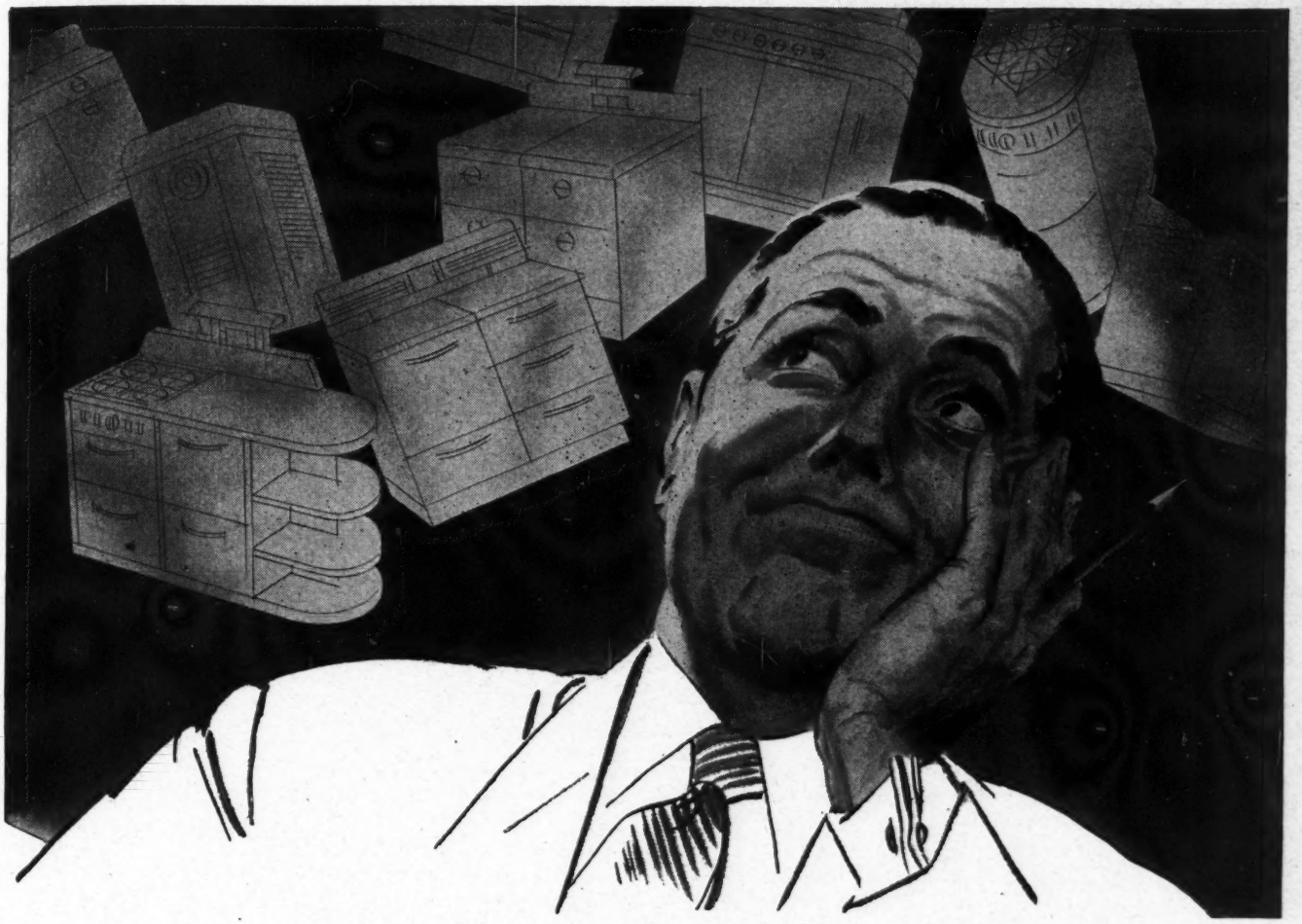
Typical designs are taken from a roster of more than 25,000 distinct items are illustrated—in groups of applications covering electrical, electronic, industrial heating, chemical, automotive and other fields. Property charts and other technical data, together with practical information on manufacturing processes, are included. Copies may be obtained upon request to the American Lava Corp.

• **Production Ideas** (bulletin EW-20)—a four page folder issued by the Eutectic Welding Alloys Co., 40 Worth St., New York 13. This folder gives a complete discussion of Eutectic's plans in the postwar period, as well as a discussion of the application of its special alloys in various production fields. Many photographs and technical diagrams illustrate the jobs that will be done postwar. There is also a listing of the 47 Eutectic welding alloys and how they can be applied in the various fields of production. Copies obtainable upon request to the Eutectic Welding Alloys Co. at the above address.

• Aerotec Co., White Plains, N. Y., has issued a new bulletin No. 101 which deals with the problem of efficient fine dust collection, particularly in the range 325 mesh screen or finer. Included are precipitating tests on various dusts in the industrial field, various powdered foods and chemicals. Also shown are the sizes available in Aerotec units from single tubes to 100,000 c.f.m. A copy will be sent on request to Termix Engineering Co., First National Bank Bldg., Greenwich, Conn.

• The Askania Regulator Co., 1603 S. Michigan Ave., Chicago 16, Ill., has released a new bulletin No. 124 which covers automatic control of glass furnaces. The control of furnace pressure, combustion, heat input, and automatic reversal are treated in detail. Askania has also issued bulletin No. 126 dealing with crank type cylinders. Free copies may be obtained by writing the Askania Regulator Co. at the above address.

• **The Fischer & Porter Co.,** 94007P County Line Road, Hatboro, Pa., has issued a new Bulletin 82-A, which discusses their new Rotasleeve rotameter for measuring large flows of liquids and gases. This Bulletin will be sent upon request to the Fisher & Porter Co.



A PRODUCTION MANAGER CAN DREAM

Can't he?

THE ABOVE is an artist's conception of how the Production Manager at Florence Stove Company is feeling these days.

Yes, he's dreaming of the day when he can "get going" on the new Florence Ranges and Heaters. And how can you blame him. From snooping around in our Merchandise Development Department he's learned about the exciting new Florence heating and cooking appliances that will come into being as soon as new tools and new dies are available. Other times he dreams of getting steel and then some more steel for current production. The fact is that as fast as we do get steel it is going into current models that are shipped out to Florence dealers right from the production lines.

This is our report to dealers now. But there will be more news . . . news that will constantly grow in importance to you and your profit opportunities. So watch for the word from Florence. It will be the *business-like* thing to do.

FLORENCE STOVE COMPANY. . . General Offices and Plant: Gardner, Mass. Western Offices and Plant: Kankakee, Ill. Southern Plant: Lewisburg, Tenn. Sales Offices: One Park Avenue, New York; 1459 Merchandise Mart, Chicago; 53 Alabama St., S. W., Atlanta; 301 No. Market St., Dallas.

FLORENCE
Gas Ranges

CURRENT READING

Commercial Production of Pure Hydrogen from Hydrocarbons and Steam—R. M. Reed. "Petroleum Refiner," Sept., 1945, pp. 119-122. The reaction of hydrocarbons and steam at 1400 to 1800°F. over a nickel catalyst to produce carbon oxides and hydrogen, followed by the water gas shift reaction at 800°F. over an iron oxide catalyst, has been utilized commercially in this country on a large scale since 1930 to produce hydrogen containing 1.0 to 1.5% methane and 1.5 to 2% carbon monoxide. Calculations with available equilibrium data indicate that above 1500°F. methane and steam can produce hydrogen containing less than 0.1% methane without the use of excessive quantities of steam.

A commercial plant has recently been placed in operation which produces hydrogen of the following analysis from propane and steam: Carbon dioxide, 0.001%; Oxygen, 0.005%; Carbon monoxide, 0.001%; Methane, 0.018%; Nitrogen, 0.007%; and Hydrogen, 99.68%. To produce this hydrogen, propane is desulfurized and reacted with steam in two stages, after which the crude hydrogen is cooled and CO_2 removed by scrubbing with monoethanolamine solution. Final purification is effected by two stages of carbon monoxide conversion, each followed by carbon dioxide removal.

Selective Heating and Fatigue Failures, Informative Letter No. 5, has been issued by the Industrial and Commercial Gas Section of the A.G.A. Carl H. Lekberg, chairman of the Committee on Heat Treating of Gas, has prepared the letter with accompanying diagrams.

Calculation of Static Pressure Gradients in Gas Wells—M. J. Rzasa and D. L. Katz. American Institute of Mining and Metallurgical Engineers, Technical Publication No. 1814. In the introduction the authors remark: "As the pressure measurements become more accurate, the need for reliable calculation of the static pressure gradient often arises." Briefly, this states the purpose of the article.

Development of Oil Shale Resources Undertaken by U. S. Bureau of Mines—A. J. Kraemer and P. E. Buchan. "Chem. and Engr. News," Sept. 10, 1945, pp. 1523-1527. Increased consumption of petroleum has renewed an interest in the potential reserves of synthetic liquid fuels in the United States. This paper reviews the events leading up to the passage of the Synthetic Liquid Fuels Act and outlines the Bureau of Mines program that deals with the development of the oil-shale resources of the nation.

Synthetic Liquid Fuels Program—A. O. Fieldner. "National Petroleum News," Sept. 5, 1945, pp. R-709, etc. While the U. S. Bureau of Mines had previously carried on small scale research on synthetic liquid fuels, in anticipation of a future deficiency in petroleum supplies, a broad and comprehensive program is already under way, provided by special legislation passed in 1944. Included is intensive work in the direct hydrogenation of coal and lignite and in the gas synthesis process for the conversion of coal, coke, lignite, natural gas, and other carbonaceous materials to liquid fuels; as well as on processes for the recovery and refining of oil from shale.

The early development and pilot plant work is for the purpose of providing new and improved procedures for demonstration plants of up to 200 b-d capacity for coal hydrogenation and gas synthesis. Site has already been selected for a demonstration plant to mine and process 200 tons a day of oil shale. Details of the work to date are described and the future program outlined.

Corrosion Prevention by Controlled Calcium Carbonate Scale—S. T. Powell, H. E. Bacon and J. R. Lill. "Ind. and Engr. Chem.," Sept., 1945, pp. 842-846. The use of controlled calcium carbonate scale for corrosion prevention in cooling tower systems serving steel equipment has been investigated at plants constructed for war production, when copper alloys were scarce. The study revealed factors that markedly affect the success of the treatment, which have hitherto had little recognition. If rising temperatures cause the actual pH of the water to drop at the same rate as the calcium carbonate saturation pH, scale of uniform thickness will be deposited over the entire temperature range. Conditions under which this occurs are described.

Statutory Regulations in the Carbon Black Industry—Leslie Moses, formerly of the New Orleans Bar, now secretary and counsel of Fohs Oil Co., Houston. Reprinted from Vol. XX Tulane Law Review 83-97, Oct., 1945, New Orleans, La. In Texas and Louisiana, the two largest producers, the carbon black industry is regulated very thoroughly. The legislation, however, is designed to diminish waste, not use, and consequently it is deemed by the courts to be just and proper. The laws of the two states are similar in most respects, but do vary on some important details. For instance, the Texas legislation attempts to meet the special need created by the presence of large quantities of residue sour gas in the Panhandle Field and attempts to assure a maximum use of that type of gas. Parallel tables in the pamphlet serve to demonstrate the similarities and differences between the two schemes of regulation.

Plan To Be Comfortable—a 24-page consumer booklet to guide home owners in the selection of heating systems, released by the National Radiator Co., Johnstown, Pa. Although the booklet was especially written for the lavman, it will also be helpful to architects, builders and heating contractors in discussing heating problems with home owners planning postwar building or remodeling.

New Handbook on Protection Against Lightning—published by the National Bureau of Standards. A copy is now available as National Bureau of Standards Handbook H40, obtainable for 20c a copy from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Part I of the Handbook deals with the protection of persons.

Part II deals with the protection of buildings and sets up standards for adequate rodding of such structures. Lightning rods are recommended for tall or isolated frame or masonry structures but are generally unnecessary for steel framed buildings since the steel frame is itself a good lightning rod. In some buildings with steel skeletons, points are provided at the top to protect stone copings or chimneys, those points being connected to the steel frame.

Part III covers structures containing flammable liquids. Developments during the past seven years have made it necessary to rewrite completely this portion of the code, which now offers a number of modern methods for protecting oil refineries, tank farms, and the like. This revision was prepared by a representative committee headed by W. W. Lewis, of the General Electric Co., a nationally known authority on lightning and lightning protection. As a war measure it was vitally important to safeguard the nation's supply of petroleum in storage, in process of manufacture, and in final form as gasoline, fuel oil, and the thousands of other necessary products made from it. The revised part III should help in the protection of this vital oil supply from one of its greatest hazards.

Form No. L-415—"Question and Answer Booklet." This booklet contains questions most frequently asked about Chrysler Airtemp year 'round air conditioning for the home, and the answers to those questions and is published by the Chrysler Corp., Airtemp Division, Dayton 1, Ohio. The booklet was compiled after much research covering all the questions asked about winter and summer air conditioning for the home. For a free copy of the booklet, send your request to the Airtemp News, at the above address.

Thermodynamic Properties of Methane at Low Temperature—W. H. Corcoran, R. R. Bowles, B. H. Sage and W. N. Lacey. "Ind. and Engr. Chem.," Sept., 1945, pp. 825-828. The thermodynamic properties of methane from 70° to 230°F. and from atmospheric pressure up to 1400 psi. absolute have been derived from data existing in the literature and are presented in tabular and graphical form.

Heat Loss from Pipes Determined Graphically—O. F. Warner and G. A. Hawkins. "Industry and Power," Sept., 1945, pp. 62, 63. The system described and illustrated for calculating heat losses from insulated pipes requires only a small fraction of the time ordinarily needed.

Dry Gas Accounting—C. Van Gundy. "Oil Weekly," Sept. 24, 1945, pp. 53-55. Gas accounting procedure employed by the Panhandle Eastern Pipe Line Co. is described.

CUSTOMER ACCEPTANCE

Wherever the WARD Floor Furnace is known it enjoys *unusual customer acceptance.* This is due to the efficient, trouble-free operation enjoyed by WARD owners over a long period of years.

At the present time we are able to supply WARD dealers with only a fraction of their requirements. However, we are looking forward to the time when we will be able to offer additional dealers the sales advantages of WARD Floor Furnaces.

We invite preliminary correspondence from interested parties.

WARD HEATER COMPANY

1800 WEST WASHINGTON BLVD.

LOS ANGELES 7, CALIFORNIA

37 — 36 years of "KNOW-HOW"

Truck Explosion Causes Break in Gas Line

By HAROLD KEEN, Staff Correspondent

EXPLOSION of an ammunition-laden Navy truck and trailer Dec. 18 on the Coast Highway 15 miles north of San Diego, Calif., resulted in a break in the Southern Counties Gas Co. 12-in. transmission line, thereby imperilling the natural gas supply piped into San Diego from Huntington Beach.

Escaping gas flared up in a spectacular display for about two hours—the intense heat contributing to continued explosions of the ammunition after the initial blast, which wrecked 250 homes in the nearby Torrey Pines and Libertad federal housing projects, and extensively damaged buildings in the army's Camp Callan and the Marine Corps' Camp Matthews.

The main explosion occurred at 3:20 p. m.; at 4:15 p. m., a supervisor from the San Diego Gas & Electric Co. arrived, and reported that the fire prevented close inspection of the damage. Notwithstanding a large leak in the pipe, some gas still was coming through to San Diego—amounting to 259,000 cu. ft. an hour.

As a preliminary to effecting necessary repairs, the line was shut off at 5:45 p. m., and the company broadcast appeals on local radio stations to householders to curb their use of gas for all but essential cooking purposes.

To complicate the situation further, the transmission line had been shut off at Dana Point to tie in the compressor plant at 10 a. m. that morning. As a result, the San Diego utility was somewhat low on storage when the explosion occurred, according to company officials. Number 4 holder was down to 4,500,000 cu. ft., while Number 3 was almost full. The manufactured gas plant had been in operation since 7 a. m., and operation was continued throughout the night, while repairs on the line were being rushed.

Oil gas was produced at the rate of 750,000 cu. ft. an hour and butane at 230,000 cu. ft. an hour. The drop in storage was stopped at 11:15 p. m., with 3,400,000 cu. ft. still in the holders, primarily because of prompt response by residents to the emergency appeals by the company. A total of 12,500,000 cu. ft. of oil gas and 1,600,000 cu. ft. of butane-air gas was produced.

Meters supplying the two military camps and the housing projects were shut off, due to the extensive damage to structure and equipment. It was not until two days later that utility inspectors completed checking all gas connections in the houses to determine whether any leaks existed that would make occupancy hazardous. Families who had been evacuated were then permitted to return to their homes while repairs to the buildings were still under way.

A complete inspection of the damaged line showed that approximately 35 ft. of pipe had been flattened. This section was cut out and replaced by crews permitted to enter the area at 11 p. m., almost eight hours after the disaster, which fortunately cost no lives but resulted in injuries to about 20 persons.

FPC Denies Reconsideration Of Mississippi Rate Case

The Federal Power Commission Dec. 7 denied an application filed by Mississippi Power & Light Co., Jackson, Miss., for reconsideration of the Commission's order of Oct. 3, dismissing the company's complaint against Memphis Natural Gas Co., alleging that the rates charged by Memphis for services from June 21, 1938 to July 26, 1943 were in violation of its Mississippi contract.

Mississippi's complaint requested the Commission to determine the just and reasonable rate for gas delivered to the city gate by Memphis to Mississippi during the period. By its order of Oct. 3, the FPC concluded that, "The Commission is without authority under the Natural Gas Act to grant the relief requested." The later order states that no new facts or principles of law have been presented which would justify a reversal, revision or stay of its Oct. 3 order.

FPC Authorizes Interstate Connections Until March

The Federal Power Commission has announced that emergency war orders authorizing the use of specified interstate interconnections to strengthen the power supply for the war effort can be used to and including March 15, 1946, without affecting the status of the companies as "public utilities" under the Federal Power Act. When the wartime interconnections involved were originally authorized, some of the orders specified 90 days and others six months after the cessation of hostilities before companies would be subject to the jurisdiction of the Commission.

A. O. Smith Corp. Building $2,000,000 Plant

The A. O. Smith Corp., Milwaukee, will manufacture household appliances in its new $2,000,000 plant under construction near Kankakee, Ill. Designed by Fred V. Prather, Chicago architect, it will be built on an 80-acre tract.

The plant and offices will be heated by gas-fired radiant heat units.

Reconsideration Sought In FPC "Boiler Fuel" Ruling

Northern Natural Gas Co., Omaha, has filed a petition with the Federal Power Commission asking reconsideration of the order of Nov. 6 which denied its application to sell natural gas to Iowa Electric Light and Power Co. for use as boiler fuel in Iowa's Boone electric generating plant and limited such sales of gas to use for the operation of pilot burners, ignition purposes and emergency standby in the case of breakdown of coal burning and coal handling equipment.

The petition challenges the FPC order on the ground that the proposed sale of gas for use as boiler fuel would be a direct sale for immediate consumption and not for resale, and thus would not be subject to jurisdiction under the Natural Gas Act.

Northern Natural has also applied for authority to sell natural gas to Iowa Electric for distribution to retail customers in Boone, Iowa. The company states that in 1944 the Boone City Council passed a franchise ordinance authorizing Iowa Electric, which now serves 525 Btu mixed gas, to distribute natural gas in Boone for domestic, commercial and industrial purposes. When the ordinance was adopted, Iowa Electric was unable to secure the materials and labor to make the change-over because of war shortages. It is now expected that labor and materials will be available in the spring and the conversion can be effected by May or June 1946.

Kentucky Co. Chartered To Serve Eight Cities

The Kentucky Natural Gas Distributing Co. was chartered recently to furnish gas to eight central Kentucky cities and will have headquarters in Frankfort. John E. Buckingham, former Kentucky state treasurer, and vice president of the new company which has $100,000 capital stock, said it would expend $5,000,000 in bringing natural gas for the first time to these communities.

The company will purchase gas from the Tennessee Gas and Transmission Co., Houston, which recently completed a line from Corpus Christi, Texas, into Tennessee and West Virginia. Principal owner of Kentucky Natural is J. R. Horrigan, of Houston, president. Other incorporators in addition to Horrigan and Buckingham are D. Dean Edwards, Neal R. McKay and Ben O. Law, all of Houston.

New Union Contract Brings Brooklyn Union Wage Rise

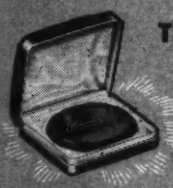
A new contract was recently signed by representatives of The Brooklyn Union Gas Co. and Local 101, utility division, Transport Workers Union, CIO, which provides for a general increase in salary and wage scales, a union shop, dues checkoff for all union members and a semi-automatic progression plan. The contract will govern management-employee relations until Dec. 31, 1946.

The pay increase, amounting to $5 a week for employees earning up to $4740 a year and graduated amounts for those earning up to $5000, is retroactive to Aug. 12, 1945.

The NEW Sales Story for GAS WATER HEATERS

SMITHway *Permaglas* Water Heaters... lined with *Permaglas*... give you the most dramatic, NEW sales story in the appliance business!

SMITHway *Permaglas*
GLASS-FUSED-TO-STEEL
TRADE MARK REG. U. S. PAT. OFF.



There's Only ONE *Permaglas*

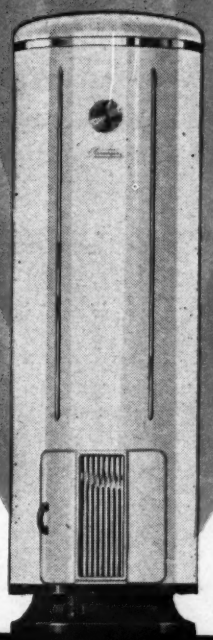
1 The single-piece glass-lined tank—lined with *Permaglas*, the sparkling blue, mirror-smooth glass-fused-to-steel.

2 Sanitary as a sparkling drinking glass... for *Permaglas* has been tested with waters from every state in the Union.

3 Freedom from all tank rust and corrosion. *Permaglas* CANNOT rust or corrode under *any* water conditions.

4 No tank-corrosion in the bath . . . no "tank spots" on clean clothes.

5 Sparkling clean hot water as pure as its source!



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A total of 23,000 test-years went into the perfecting of this truly modern water heater . . . the heater that "packages" hot water in glass!

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SMITHway *Permaglas* WATER HEATERS

A. O. SMITH Corporation

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FOR QUICK, ECONOMICAL MANUFACTURED GAS PLANT CONVERSION

One of the growing postwar industrial adjustment programs is that of the conversion of utility gas plants from manufactured gas to Liquefied Petroleum Gas. The larger initial cost of new manufactured gas plants and higher labor and equipment replacement costs for old plants in small cities emphasize the advisability and profitability of Warren's Liquefied Petroleum Gas.

The use of Butane and Propane as substitutes for stand by and peak load operations is an economical source of security against interrupted service and unsteady or inadequate supply. Warren now has greatly increased supplies and additional tank cars to serve the Gas Industry. Our broad experience, engineering advice and consulting service is available without obligation.

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TULSA, OKLAHOMA
Detroit, Michigan Houston, Texas

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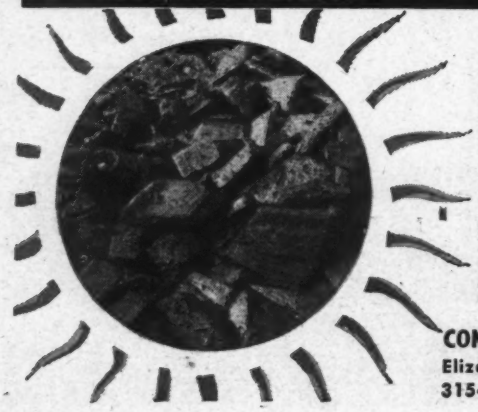

High in efficiency . . . low in cost. In hundreds of plants throughout the country, Connelly Iron Sponge has proven itself . . . the finest purification material on the market. Not only does it lower your purifying cost but its high activity and capacity tends to reduce distribution and service complaints because of the cleaner gas which ultimately lowers operating and maintenance costs.

If you have a problem in gas purification, Connelly's 68 years of experience is at your service. Our engineers can help you . . there is no obligation on your part.

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3154 S. California Ave., Chicago 8, Illinois

PIPELINE NEWS

• The Federal Power Commission Dec. 7 received an application filed by the Kansas-Nebraska Natural Gas Co., Inc., Phillipsburg, Kan., for permit (1) to construct additional facilities in Kansas and Nebraska, including 77 miles of 16-in. and 12¾-in. line and additional compressor facilities to enable it to increase the amount of gas transmitted through its own lines from the Hugoton field, and about 100 miles of branch or lateral lines to serve 16 Nebraska communities; (2) to replace 56 miles of its present pipeline system with pipe of smaller diameter, and (3) to acquire about 36 miles of branch pipelines from the Central Electric & Gas Co., to which Kansas-Nebraska sells gas at wholesale. Total cost of the proposed undertaking is estimated at $1,575,000.

The company states that it desires to begin construction by March, 1946, and to complete it by Oct. 1, 1946, and wishes to purchase the facilities from Central Electric & Gas Co. as soon as practicable.

• The FPC announced Dec. 21 an order setting oral argument for Jan. 5 on applications for certificates of public convenience and necessity filed by the **Northern Natural Gas Co.**, Omaha, for authority to construct and operate facilities to enable it to meet the winter requirements of customers in Iowa, Kansas and Nebraska. The commission set oral argument in lieu of filing reply briefs to expedite its consideration and disposition of the matter. Hearing on the application was concluded in Chicago, Dec. 5. The facilities under consideration include approximately 50 miles of pipeline at an estimated cost of $1,407,748.

• An expansion program which will result in a 50% addition to present compressor horsepower and an increase of 8000 Mcf per day in line capacity, is under way by **Canadian River** and **Colorado Interstate Gas Co.'s.** Work on the project is being done by the Stearns-Roger Manufacturing Co. of Denver, and the total cost is estimated at $1,750,000. Most expensive single phase is the construction of a $500,000 Colorado Springs Compressor Station which will house 3200 of the additional 11,000 hp. capacity.

• The FPC Dec. 20 concluded its hearing on application of the **Reynosa Pipe Line Co.**, Corpus Christi, to export natural gas from the Rio Grande Valley to Monterrey, Mexico. Action by the Commission was not expected for several weeks since the company was given until Jan. 10 to submit additional data to support its request to deliver 60,000 Mcf of gas daily to Mexico.

• The Memphis Natural Gas Co. plans to parallel its line from Benoit to Cleveland, Miss. This will double capacity of the line from Monroe, La., to Memphis.

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Designed for quicker selling, greater profits, and trouble-free service. Definitely the finest water heater in America today. Streamlined design . . . sturdy construction . . . built-in safety features . . . economical operation. Made for all types of gas or electricity.

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WATER HEATER CORPORATION

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PEOPLE

• **Harold W. Sweatt,** president of Minneapolis-Honeywell Regulator Co., has announced the election of four vice presidents, establishment of two executive posts and changes in the sales and production divisions.

C. D. Lyford

The vice presidents are **C. D. Lyford,** in charge of sales to the gas industry; **Paul B. Wishart,** in charge of factory operations in Minneapolis; **Arthur H. Lockrae,** in charge of the heating controls department; and **John E. Haines,** in charge of the commercial controls department.

C. B. Sweatt and **W. L. Huff** were elected executive vice presidents and Huff will also continue as company treasurer. **James H. Binger** will assume the duties of **W. F. Marquart,** assistant secretary, who is retiring to return to law practice.

Thomas McDonald was appointed vice president in charge of sales and will assume responsibility for the activities formerly supervised by C. B. Sweatt. **Alfred M. Wilson,** also a vice president, will be in charge of aeronautical controls and will coordinate development, manufacturing and sales operations.

• **George S. Hawley,** president of The Bridgeport Gas Light Co., Bridgeport, Conn., has announced the appointment of **Ronald A. Malony,** sales manager, as assistant to the president.

• **Robert S. Bubb** has been appointed sales promotion and advertising manager of Dresser Manufacturing Division, Dresser Industries, Inc., Bradford, Pa., according to **Hector P. Boucher,** general manager. Bubb has served with the navy for the past four years and, prior to that time, he was engaged in industrial advertising and marketing.

• **G. F. Brunston,** former assistant general superintendent and chief engineer of Colorado Interstate Gas Co., Colorado Springs, Colo., has been named general superintendent of the company, succeeding the late **J. P. McClintock. C. B. Abbot** will fill the position of chief engineer.

• **Lieutenant General James H. Doolittle,** former commander of the 8th Air Force, returned to Shell Union Oil Corp. as vice president on Jan. 1. He will be a nominee for the board of directors at the next stockholders' meeting. Doolittle will make his headquarters in New York, where his duties will include coordination of the aviation interests of Shell Companies in the U. S. and assistance in the world-wide aviation activities of the Shell Group of associated companies.

• **John C. Flanagan,** for 15 years assistant to the president, at Shreveport, has been elected a vice president of United Gas Corp. and appointed assistant genera manager of thhe operating division, with offices in Houston. Other changes announced Jan. 2 by J. V. Strange, vice president and general manager, include promotions for three United Gas officials.

H. P. Carroll, operating manager for six years, has been given jurisdiction over all United Gas distribution operating properties, including the Houston division. He formerly superintended only those properties outside Houston.

E. L. Henderson, chief engineer, has been promoted to assistant operating manager, and **A. D. Simpson, Jr.,** a former assistant chief engineer but recently superintendent of the East Texas division, with headquarters at Jacksonville, has been named chief engineer.

• **J. H. Wilson,** former supervisor of residential sales for the Appalachian Electric Power Co. at Pulaski, Va., has become supervisor of the dealer sales promotion department of The Dayton Power and Light Co., Dayton, Ohio. Wilson will be responsible for promoting appliance sales by dealers to the company's more than 90,000 gas customers in the Dayton territory.

• **Austin Brockenbrough** has been appointed director of public utilities in Richmond, Va., according to an announcement by **Mayor Herbert.** Brockenbrough is the former state PWA director in Virginia and has served in the engineer corps of the naval reserve since 1943.

• **Major Henry C. Givan,** now on terminal leave from the U. S. army air forces, has been appointed sales promotion manager, Equitable Gas Co., Pittsburgh, according to an announcement by **Ray Little,** general sales manager. Major Givan will handle sales promotion on base load appliances and heating units, as well as dealer relations and cooperation. He entered the employ of the Equitable Gas Co. in 1926, and prior to entering active service with the air forces in 1942, he was supervisor of trade development for the company.

Maj. H. C. Givan

• **Frank B. Colbert,** assistant superintendent of the Wisconsin Gas & Electric Co.'s gas plant, has been named superintendent, succeeding the late Ralph Wheeler. **Frank Hengeveld** will assume the duties of general foreman.

• **Harold Massey** has been appointed assistant managing director of the Gas Appliance Manufacturers Association, **H. Leigh Whitelaw,** managing director, announced today.

H. Massey

Massey was formerly associated with the American Radiator and Standard Sanitary Corp. in the sales, advertising, engineering, and design of automatic gas water heaters, boilers, furnaces, conditioners, and conversion house-heating burners.

From 1923 to 1930 Massey was chief engineer of the Standard Gas Equipment Corp., where he was active in the development and production of domestic, commercial, and industrial cooking equipment and industrial gas burners.

The appointment of Massey is part of the Association's expanding program of assisting dealers and utilities in their promotional activities.

• **David V. Stroop** was appointed assistant to the president of the American Petroleum Institute, New York City, according to an announcement by **William R. Boyd, Jr.,** president. The new position was recently created by the board of directors.

During the war he was also executive secretary of Petroleum Industry War Council's committee on protection of petroleum facilities.

• **George A. Cunningham,** chief engineer for United Fuel Gas Co. and affiliated companies, subsidiaries of Columbia Gas and Electric Corp., was honored at a dinner given by company employees, upon his retirement after 35 years with the system.

Cunningham has been succeeded by **George H. Moore,** former assistant chief engineer. **Eugene Stump** is the new assistant chief engineer.

• **Duncan A. Crawford** has been appointed operating vice president of the entire Atlanta Gas Light Co. Crawford joined the company in 1943 as vice president in charge of all properties except Atlanta. He was formerly president of the Roanoke Gas Light Co. and Associated Public Utility Co.'s in Virginia and Tennessee, and has been connected with Stone & Webster properties since 1926.

• **George V. Buck, Jr.** was recently appointed manager, general accounting division, Philadelphia Electric Co. System. Buck has been an employee of P. E. and affiliated companies for 43 years and was general accountant at the time of his new appointment.

• **Dr. R. R. Sayers,** director of the Bureau of Mines, has announced that two petroleum engineers associated with the Petroleum and Natural Gas Division have been appointed to new positions. **C. J. Wilhelm** will fill an engineering research position at the Bartlesville, Okla., petroleum experiment station, and **Sam S. Taylor** has been named supervising engineer of the Franklin, Pa., office, the position vacated by Wilhelm.

FOR YOUR EVERY COOKING NEED!

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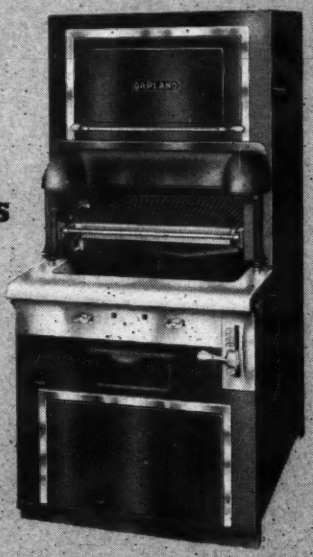
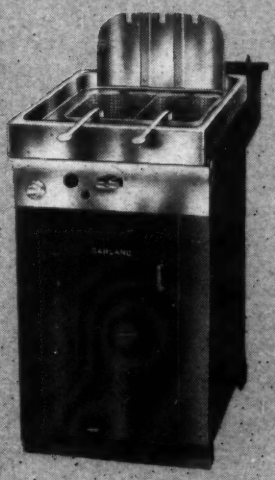
Broilers



Garland No. 632

Deep Fat Fryers



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And then add to these the rugged construction, fully automatic safety by-pass valve; easy calibration with its lack of later adjustments, and you have a sturdy, dependable meter, free from operating troubles and maintenance problems, yet delicately sensitive to the smallest differential changes, and accurate under all operating conditions.
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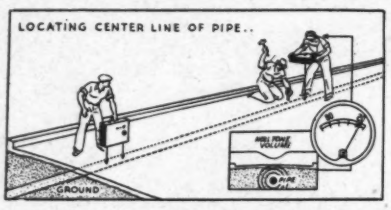
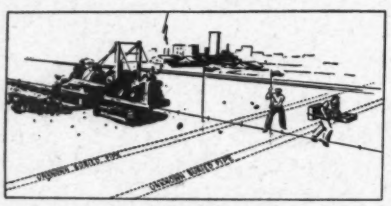
SEND FOR COMPLETE LIST OF ARCCO CHARTS





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Palo Alto, California

• **J. H. Shearer** and **C. D. Crenshaw** have been appointed to new managerial positions with Houston Natural Gas system. Shearer, who has been with the company since 1935, with the exception of one year, was transferred from manager of the Palacios district

• **Fred O. Paige** has been appointed purchasing agent of Welsbach Engineering and Management Corp. Philadelphia, and all its subsidiaries, effective Dec. 3, according to an announcement by Morse DellPlain, president. Paige, formerly executive assistant, has replaced **John F. McGough**, promoted to the new business department of the street lighting and construction companies of the Welsbach group as special representative.

• **G. F. Edwards,** former manager of the Athens office, Atlanta Gas Light Co., will serve as residential sales manager in the Atlanta office. This is a newly created position will be important once reconversion is underway. Edwards has been with the company for 11 years.

• **J. W. Moungey** has been selected for the new position of purchasing agent and superintendent of stores, Atlanta Gas Light Co. He will headquarter in the Mobile office which will now handle its affairs locally. Moungey has been with the company for 26 years.

• Bryant Heater Co., Cleveland, announces the appointment of **C. G. Allen** to its research and development staff. A graduate of Case School of Applied Science in metallurgy, Allen will devote his efforts primarily to experimental work in the development of new domestic gas heating equipment.

• Resignation of **Gus Strauss** as head of the gas utilities division of the Texas Railroad Commission effective Jan. 1, was announced Dec. 20 by **Olin Culberson,** chairman. Strauss will enter the butane gas business at Hallettsville, Texas. He will be succeeded by **S. C. McIntosh** who recently returned to his position as valuation engineer for the utilities division after serving in the army.

• **William E. Mikolasy** has been appointed eastern sales representative of Stacey Brothers Gas Construction Co., Cincinnati, one of the Dresser Industries, according to a recent announcement by A. E. Harvey, vice president. Stacey Brothers activities have been enlarged to serve the gas utilities in converting from present methods to liquefied petroleum gas operations.

Another appointment is that of **Walter E. Flagg,** who will be sales representative in the New England states.

• **C. B. Phillips,** vice president of Surface Combustion Corp., Toledo, announced the appointment of **George D. Yeazel** as factory sales representative at Kansas City, Mo., with offices at 950 Dinks Bldg. **Wallace Adams** is district manager in this area. Yeazel will direct distribution of Janitrol gas-fired heating equipment.

• **John M. Olmsted,** for many years a vice president in charge of sales on the Pacific coast for the Walworth Co., manufacturers of valves and pipe fittings, retired Dec. 1, 1945, according to a statement issued by **W. B. Holton, Jr.,** president. Olmsted had his headquarters in Los Angeles and supervised the sales activities of the Walworth Co.'s West Coast offices, located in Seattle, San Francisco, and Los Angeles.

Effective Jan. 1, **Fred J. Chittenden,** who for more than 17 years has been manager of the Walworth Co.'s San Francisco offices, will become manager of West Coast sales, with headquarters at San Francisco.

Obituaries

• **Robert L. Rundorff,** assistant gas engineer, Northern States Power Co., Minneapolis, died suddenly at St. Paul, Minnesota, on Dec. 3 at the age of 46. After graduating from the University of Wisconsin, Rundorff entered the employ of Northern States Power Co. with whom he has been continuously associated until the time of his death.

• **Samuel Lloyd Davis,** 48, financial director of the United Gas Corp. and associated companies, died of a heart attack on Dec. 6. He was a director and comptroller of United Gas Pipe Line Co. and Union Producing Co. and was treasurer of United Gas Corp. Davis had been connected with United Gas companies since 1932.

• **Clifton W. Sears,** Pasadena, Calif., one of the founders of the Natural Gas Association of America, predecessor of the natural gas department of the American Gas Association, died recently at the age of 74. In 1906 Sears suggested the need for a national natural gas organization, was made chairman of the committee on constitution and by-laws, and was a progressive leader in the industry during his entire life.

• **John Paul McClintock,** general superintendent of Colorado Interstate Gas Co., Colorado Springs, Colo., died on Nov. 27. Starting as a civil engineer, McClintock worked for the South Penn Oil Co. and for the Hope Natural Gas Co. in Clarksburg, W. Va. He became associated with Colorado Interstate in 1927, supervising the construction of that company's pipeline transmission system and later becoming general superintendent, the position he held at the time of his death.

• **James M. Brodbeck,** manager of the Chicago division, Welsbach Street Lighting Co. of America, died suddenly of a heart attack December 25, 1945 in Hammond, Ind., at the age of 61.

Brodbeck joined Welsbach in 1935 as supervisor of safety in the New York office. He became district manager in 1940, and was transferred as division manager to Chicago in 1944.

Previous to joining the Welsbach organization, Brodbeck had been manager of industrial relations, Northern Indiana Public Service Co., where he specialized in employee-management problems.

Famous Facts

Five or six hundred years B.C., water-borne traffic from the Mediterranean reached the Red Sea by way of a canal at the site of the present Suez Canal. It fell into disrepair, was restored in 100 A.D., again fell into disuse, and was restored again in 640 A.D. In 1859, the plans of Ferdinand de Lesseps were followed for the construction of the present Suez Canal, at a cost of over 130 million dollars. It is a sea-level canal, without locks, running some 100 miles between Fort Said on the Mediterranean and Port Tewfik, south of Suez, Egypt, across the Isthmus of Suez. The first ships sailed through the new canal in 1869. Today, the annual tonnage amounts to over 30 million tons.

By the time the Suez Canal was finished, Bitumastic Enamel, the first product of its kind, was winning acclaim as a protective coating for underground and underwater surfaces. Today it is giving maximum corrosion protection to pipe lines, steel and iron structures and surfaces throughout industry.

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GAS PRODUCTION

• To conserve gas in the reservoir, the **Oklahoma Corporation Commission** recently issued an order setting the market demand for natural gas in the West Cement, Medrano and Chickasha pools in the Texas county, Okla., sector of the Hugoton field. In the West Cement, Medrano pool are wells producing oil and also a number of wells producing gas only. The order stated that it was necessary to restrict production of gas-producing wells to 23,626 Mcf. per day during December.

Total production of gas in the Chickasha pool was restricted to 96,774 Mcf. daily for December and 107,258 Mcf. per day for January. Production for the entire Texas county sector of the Hugoton field was restricted to 256,332 Mcf. per day for December and to 257,581 Mcf. per day for January.

• The first large natural gas field in the Canadian province of Alberta—discovered in the Medicine Hat-Redcliff area more than a half-century ago—has been expanded by recent outpost drilling.

The field now takes in a proven area of some 58,000 acres with limits not yet found, and rates among the largest gas reserves established in Alberta. Minimum estimates of current reserves range from 115 to 170 MMcf., and actual recoverable reserves may be near the estimated Turner Valley field remaining reserve of 300 to 400 MMcf.

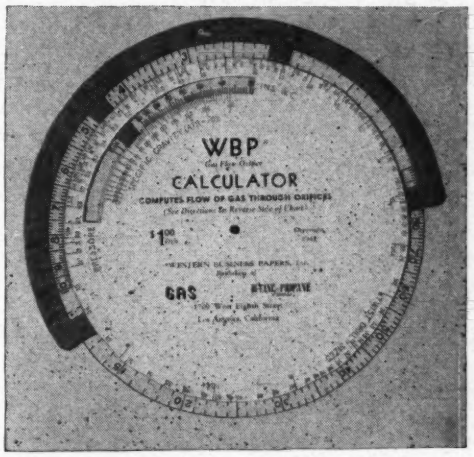
• Condensate was recently reported in a new field discovery well in Calcasieu parish in the Mossville area, about five miles west of Lake Charles, La. The wildcat test is **Union Sulphur Co.'s** No. 1 Bordages, which gauged 60.72 bbls. of high-gravity oil daily through a 13-64-in. choke from perforations at 8480-90 ft. Gas-oil ratio was 23,476 cu. ft. of gas to the barrel of oil, and tubing pressure was 2200 lbs.

• **H. W. Snowden,** Dallas, Texas, has completed 10 gas wells and is drilling or starting 19 more on leases in the Cement field of Caddo Co., Okla. The company plans construction of a gasoline plant in the area which will have a capacity of 30,000 Mcf. per day. The Oklahoma Natural Gas Co. and Consolidated Gas Utilities Corp. are running gas from Snowden wells.

• During October drilling operations of **Union Producing Co.** resulted in 10 new well completions and five completed workovers, while new drilling proceeded at nine locations in Texas and Louisiana. Eight of the completed wells were successful gassers and two were oil producers. Half the total completions were in the Carthage field near Dallas, and all the Carthage wells were gassers.

• **Magnolia Petroleum Co.** discovered the fifth gas well to be found in the West Edmond, Okla., field which is primarily an oil area. The new well had a production of 12,440 Mcf. daily.

W.B.P. Gas Flow Orifice Calculator



How Calculator Operates

To Find Drill Size

1. Rotate movable dial until specific gravity coincides with gas pressure.
2. Rotate movable segment until proper orifice coefficient coincides with desired gas quantity (cu. ft. per hr.). If orifice coefficient is not known, use 0.8.
3. Read drill size on movable dial opposite the arrow (0.8) on the orifice coefficient scale of movable segment.

To Find Cubic Feet Per Hour From B. t. u. Per Hour

1. Rotate movable segment until heating value of gas (B. t. u. per cu. ft.) coincides with gas quantity in thousands of B. t. u. per hour on quantity scale.
2. Read gas quantity in cu. ft. per hour against 1.0 (orifice coefficient scale).

To Find Quantity (Cu. ft. Per Hour) for Given Drill Size

1. Rotate movable dial until specific gravity coincides with gas pressure.
2. Rotate movable segment until arrow (0.8) on the orifice coefficient scale is opposite appropriate drill size.
3. Read quantity (cu. ft. per hr.) against appropriate orifice coefficient. If orifice coefficient is not known, use 0.8.

To Find B. t. u. Per Hour Given Cubic Feet Per Hour

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Texas-California Line Awaits Official Decision

If favorable decisions are received from the California Railroad Commission and the Federal Power Commission on the application of Southern California Gas Co. and Southern Counties Gas Co. for permission to construct 214 miles of 26-in. pipeline from Blythe near the California-Arizona border to Santa Fe Springs, near Los Angeles, construction on the new line will begin Oct. 1 with deliveries of gas planned for mid-1947. Hearings were held in Los Angeles in December, and since no opposition was presented, favorable action is expected.

The proposed line will connect with a 720-mile line to be built by El Paso Natural Gas Co. from the southeastern corner of New Mexico near the town of Jal and will afford a 272-mile connection with the Hugoton gas field. Total cost of the 1206-mile natural gas line with the necessary booster stations and other facilities will be about $50 million, and it will have an initial capacity of 175 MMcf daily for the first five years and a maximum of 305 MMcf daily for the next 25 years. El Paso Natural Gas Co. has allocated $36 million for its construction costs, according to Paul Kayser, president, and A. F. Bridge, vice president and general manager of Southern Counties Gas Co., has estimated the cost of the California section at $12.1 million.

The first 500 MMcf will be accepted at the California-Arizona border station at a cost of 15 cents per Mcf, the next 500 MMcf will cost 11 cents per Mcf, and over 1000 MMcf the cost will be 9½ cents. The California project will require a 10,000 hp. compressor station at Blythe to handle initial deliveries and an additional 15,000 hp. to handle maximum deliveries.

If the project is approved and completed, it will be the first time natural gas will have moved across a California boundary. All available sources of natural gas in the state are now being tapped, and an adequate supply is needed to meet the demands of the 1,100,000 customers in the Los Angeles area.

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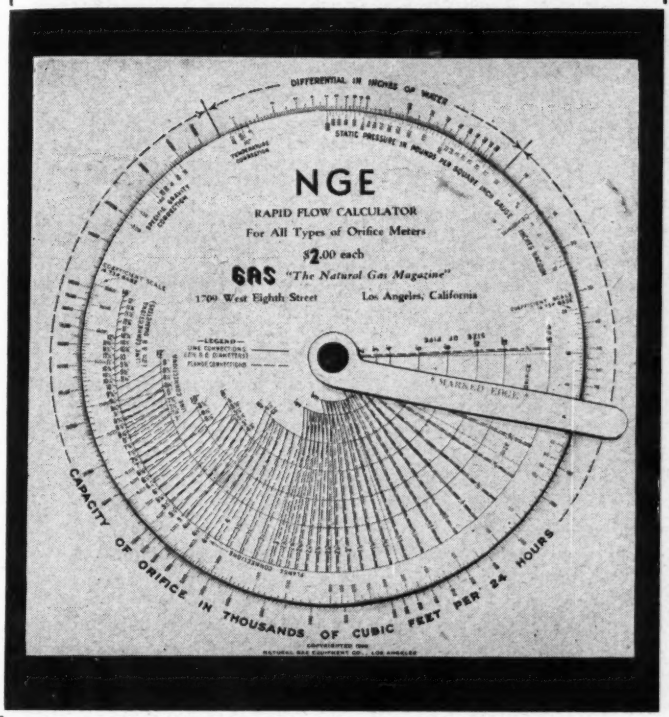
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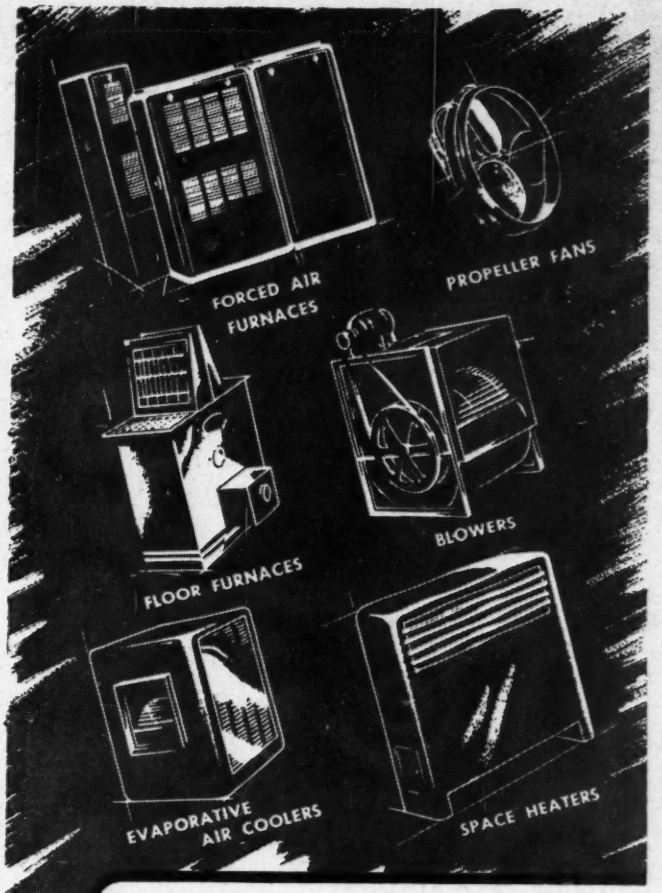

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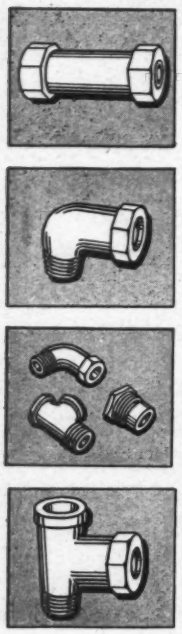

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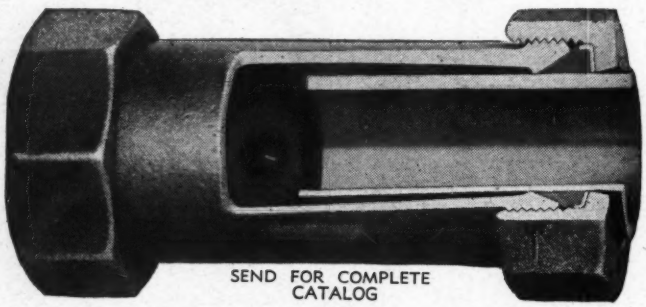

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FPC Consolidates Hearings To Determine Service Areas

A joint hearing before the Federal Power Commission on applications of Natural Gas Pipeline Co. of America and its affiliates, (Texoma Natural Gas Co. and Chicago District Pipeline Co.), and Michigan-Wisconsin Pipe Line Co., to construct facilities and serve areas in Iowa, Illinois and Wisconsin was scheduled for Jan. 8 in Washington, D. C.

Hearings on the applications have been consolidated because the facilities proposed by Michigan - Wisconsin, (Docket No. G-669), would be utilized in part to supply natural gas to areas now being served by Natural Gas Pipeline Co., and to areas which Natural Gas Pipeline proposes to serve if granted certificates in the proceedings in Docket Nos. G-231 and G-651.

Natural Gas Pipeline and its affiliate, Texoma Natural Gas Co., have requested authorization to increase capacity to deliver additional gas to communities now served and to devote a portion of the increased capacity to the delivery of gas for distribution in communities in Iowa and Illinois not now served.

In addition, in 1942, Natural requested permission to construct additions and extensions to its existing pipeline system to serve a number of cities in southern and eastern Wisconsin. At that time materials were not available to make such extensions. However, Natural, joined by Texoma, has now filed an amendment to its prior application requesting authorization to construct facilities to make available at the Illinois-Wisconsin state line quantities of natural gas for delivery to other natural gas companies which may desire to purchase it for ultimate delivery to certain Wisconsin cities and adjacent areas.

WEP Purchase Will Not Violate Antitrust Laws

The purchase and operation of the facilities of War Emergency Pipelines, Inc., by a group of companies can be accomplished without violating federal antitrust laws according to a recent letter from T. C. Clark, U. S. attorney general, to Sen. Joseph C. O'Mahoney. Clark pointed out, however, that to escape antitrust law violation, operation would have to be on a common-carrier basis with service available on equal terms to all customers. Purchase of the WEP lines is reported to be under consideration by a New York syndicate and two groups in Texas.

Wisconsin Strike Settled By Granting Wage Increase

A two-week-old strike threat by 1000 employees at the Milwaukee Gas Light Co. and its supplier, the Milwaukee Solvay Coke Co., was settled amicably with the signing of a new contract between the companies and eight AFL, CIO and independent unions. Under the new agreement the workers will receive a 10% wage increase and an additional 5% increase for each individual when his working hours are reduced from 48 to 40 a week, plus a number of individual wage adjustments.